Calhoun: The NPS Institutional Archive

DSpace Repository

Theses and Dissertations | 1. Thesis and Dissertation Collection, all items

2008-06

CV or not to be? alternatives to U.S. sea-based air power

Cruz, Yniol A.

Monterey, California. Naval Postgraduate School

http://hdl.handle.net/10945/4077

Downloaded from NPS Archive: Calhoun

http://www.nps.edu/library

Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

CV OR NOT TO BE?
ALTERNATIVES TO U.S. SEA-BASED AIR POWER

by

Yniol Cruz

June 2008

Thesis Advisor: John Arquilla
Second Reader: Wayne P. Hughes Jr.

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY ***(Leave blank)***	**2. REPORT DATE** June 2008	**3. REPORT TYPE AND DATES COVERED** Master's Thesis	
4. TITLE AND SUBTITLE CV or Not to Be? Alternatives to U.S. Sea-Based Air Power		**5. FUNDING NUMBERS**	
6. AUTHOR(S) Yniol A. Cruz			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000		**8. PERFORMING ORGANIZATION REPORT NUMBER**	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A		**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited		**12b. DISTRIBUTION CODE**	

13. ABSTRACT (maximum 200 words)

The thesis focuses on aircraft carriers and identifying an appropriate path towards the future of U.S. sea-based air power by studying historical cases of air power integration into the war fighting capabilities of the fleet. It analyzes current utilization and effectiveness of the aircraft carrier, given its operational requirements with respect to identified threats as described in security and strategy statements. It can be agreed upon that the U.S. Navy requires air cover; but whether air cover should be sea-based in the form of super carriers, jeep carriers, VTOL/STOVL aircraft on many vessels, or even land-based USAF protection in littoral settings, is the question this thesis investigates. Proponents of U.S. super carriers suggest no other single asset in the U.S. military arsenal can bring as much concentrated striking power to U.S. decisionmakers' ability to respond to crises nearly anywhere in the world. Despite this, a fundamental question arises: What does the future hold for sea-based air power? Aircraft carriers are among the military's costliest assets. With defense budgets under close scrutiny, policymakers are under growing pressure to fully exploit military assets and to minimize the prospects that assets may be underutilized.

14. SUBJECT TERMS Aircraft carriers, super carriers, jeep carriers, STOVL aircraft, alternative sea-based air platforms, defense budget, CVN-21 (CVN-78), asymmetric threats, irregular warfare, special operations forces, sea-based air power, air-capable ships.	**15. NUMBER OF PAGES** 117
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

CV OR NOT TO BE?
ALTERNATIVES TO U.S. SEA-BASED AIR POWER

Yniol A. Cruz
Lieutenant Commander, United States Navy
B.A., Berklee College of Music, 1988

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN DEFENSE ANALYSIS

From the

NAVAL POSTGRADUATE SCHOOL
June 2008

Author: Yniol A. Cruz

Approved by: Professor John Arquilla
Thesis Advisor

Professor Wayne Hughes Jr.
Second Reader

Professor Gordon H. McCormick
Chairman, Department of Defense Analysis

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

The thesis focuses on aircraft carriers and identifying an appropriate path towards the future of U.S. sea-based air power by studying historical cases of air power integration into the war fighting capabilities of the fleet. It analyzes current utilization and effectiveness of the aircraft carrier, given its operational requirements with respect to identified threats as described in security and strategy statements. It can be agreed upon that the U.S. Navy requires air cover; but whether air cover should be sea-based in the form of super carriers, jeep carriers, VTOL/STOVL aircraft on many vessels, or even land-based USAF protection in littoral settings, is the question this thesis investigates. Proponents of U.S. super carriers suggest no other single asset in the U.S. military arsenal can bring as much concentrated striking power to U.S. decisionmakers' ability to respond to crises nearly anywhere in the world. Despite this, a fundamental question arises: What does the future hold for sea-based air power? Aircraft carriers are among the military's costliest assets. With defense budgets under close scrutiny, policymakers are under growing pressure to fully exploit military assets and to minimize the prospects that assets may be underutilized.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I. INTRODUCTION 1

II. OPERATION ENDURING FREEDOM 9
A. OEF ANALYSIS 25

III. OPERATION IRAQI FREEDOM 33
A. OIF ANALYSIS 40

IV. FALKLANDS WAR 49
A. FALKLANDS WAR ANALYSIS 60

V. ANALYSIS 71

VI. CONCLUSION 91

LIST OF REFERENCES 95

INITIAL DISTRIBUTION LIST 103

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

Figure 1. Technology…Opportunities and Payoff.....89

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

I would like to thank the entire faculty of the Defense Analysis department for their enlightening instruction, mentoring and guidance; it has been a privilege to have had the opportunity to attend NPS. I would also like to thank my thesis advisor Dr. John Arquilla and second reader Professor Wayne P. Hughes Jr., without whose guidance and wisdom I could not have accomplished the work. Neither are responsible for the use I have made of their thoughts and insights. I thank my family for their relentless support.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

The thesis will focus on aircraft carriers and identifying an appropriate path towards the future of U.S. sea-based air power by studying historical case studies of air power integration into the war fighting capabilities of the fleet. It will attempt to analyze current utilization and effectiveness of the aircraft carrier, given its operational requirements with respect to identified threats as described in security and strategy statements. It can be agreed upon that the U.S. Navy requires air cover; but whether air cover should be sea based in the form of super carriers, jeep carriers, VTOL/STOVL aircraft on many vessels, or even land based USAF protection in littoral settings, is the question this thesis hopes to investigate.

Proponents of U.S. super carriers suggest that no other single asset in the U.S. military arsenal can bring as much concentrated striking power to U.S. decisionmakers' ability to respond to crises nearly anywhere in the world. The military advantages of aircraft carriers are obvious: They can quickly i.e., in days to a few weeks, move an air wing of about 75 aircraft (40+ strike fighters) to distant theaters of war; respond rapidly with precise firepower to changing tactical situations; support several missions at once, with as many as 200+ sorties per day; and deploy in international waters without permission of other nations.

Despite these generally accepted certainties, a fundamental question arises: What does the future hold for sea-based air power? Aircraft carriers are among the military's costliest assets. With defense budgets under an

unblinking lens of scrutiny, policymakers are under growing pressure to fully exploit all military assets and to minimize the prospects that assets may be underutilized.[1] Skeptics about aircraft carriers suggest that the age of the super carrier as we know it has reached the end of its lifespan - suggesting the U.S. Navy's capital ship of choice has become a platform requiring critical scrutiny when measured against today's threat and economic environment. Despite these concerns, the immediate future of U.S. carrier aviation continues to unfold with the development and procurement of the *Ford* (CVN-78) class CVN-21. Can other weapons platforms, maritime or shore-based, be more cost effective under a measure of effectiveness appropriate for the 21st century?

The Navy's current carrier force includes one conventionally powered carrier and 10 nuclear-powered carriers (the one-of-a-kind *Enterprise* CVN-65 and 9 *Nimitz* class ships, CVN-68 through CVN-76). The most recently commissioned carrier, the *Ronald Reagan* CVN-76, was procured in FY1995 at a cost of $4.45 billion[2] and entered service in July 2003 as the replacement for the *Constellation* CV-64. The next carrier, the *George H. W. Bush* CVN-77, was procured in FY2001 and is scheduled to enter service in 2008 as the replacement for the *Kitty Hawk*. The Navy retired the *Kennedy* in FY2007 and thus reduced the carrier force to a planned 11

---

[1] John Gordon et al., *Leveraging America's Aircraft Carrier Capabilities, Exploring New Combat and Noncombat Roles and Missions for the U.S. Carrier Fleet* (Santa Monica, CA 90407-2138: RAND Corporation, 2006).

[2] Ronald O'Rourke, *Navy CVN-21 Aircraft Carrier Program: Background and Issues for Congress* (Washington D.C.: Congressional Research Service - The Library of Congress, 2007).

ships. CVN-77 is the Navy's final Nimitz-class carrier. The Navy's successor to the Nimitz-class aircraft carrier design is the CVN-21 design. Compared to the Nimitz-class design, the CVN-21 design will incorporate several incremental changes, including an ability to generate about 25 percent more aircraft sorties per day over the Nimitz class, as well as features permitting the ship to be operated by a crew that is several hundred sailors smaller, reducing life-cycle operating and support costs. The Navy estimates CVN-78's (the first CVN-21 design class) total acquisition (i.e., research and development plus procurement) cost at about $13.7 billion.[3] This figure includes about $3.2 billion in research and development costs and about $10.5 billion in procurement costs. The procurement cost figure includes about $2.4 billion for detailed design and nonrecurring engineering work for the CVN-21 class, and about $8.1 billion for building CVN-78 itself.[4] An issue for the Navy and Congress, is whether to continue procuring only large-deck, nuclear-powered aircraft carriers like CVN-21 class ships, which have full load displacements of about 100,000 tons, or whether procurement of such ships should be replaced by, or supplemented with, procurement of smaller and less expensive sea-based air platforms. Some observers have suggested procurement of smaller carriers such as the 57,000-ton displacement medium-sized carrier or the 13,500-ton displacement high-speed "pocket" carrier developed by the Naval Postgraduate School under an effort called the

[3] Ronald O'Rourke, *Navy CVN-21 Aircraft Carrier Program: Background and Issues for Congress* (Washington D.C.: Congressional Research Service - The Library of Congress, 2007).

[4] Ibid.

Crossbow project,[5] with its aircraft carrier referred to as *Sea Archer*.[6] *Crossbow* was proposed by DOD's Office of Force Transformation in a 2005 report to Congress on potential alternative Navy force architectures.[7] The research will examine alternatives to include architecture and weapons platforms completely unlike the iconic large-deck aircraft carrier design.

Can our super carriers provide the power projection response and coverage required of the many potential global hotspots? Are our aircraft carriers too vulnerable? Would a mix or combination of large-deck and a number of smaller carriers be able to provide more coverage, as well as reduce the potential sting of losing a super carrier to modern smart anti-ship or theater ballistic missile (MaRV) weapons?

The research will examine the future of sea-based air power from a analytic perspective and aims to examine a path forward that best matches aircraft carrier design, employment, and alternatives vs. costs, risks, and operational requirements within the current existing strategic environment that includes traditional and asymmetric threats. Naval Aviation Vision 2020 describes the modern large deck aircraft carrier in these terms:

---

[5] Ronald O'Rourke, *Navy Ship Acquisition: Options for Lower-Cost Ship Designs - Issues for Congress* (Washington D.C.: Congressional Research Service, 2005).

[6] Faculty and Students, "SEA ARCHER Distributed Aviation Platform" (Master of Science, Naval Postgraduate School), ii-iii-321, www.nps.edu.

[7] Stuart E. Johnson and Arthur K. Cebrowski, *Alternative Fleet Architechture Design* (Fort Lesley J. McNair, Washington D.C.: National Defense University Center for Technology and National Security Policy, 2005), http://www.ndu.edu/ctnsp/Def_Tech/DTP%2019%20Alternative%20Fleet%20Architecture%20Design.pdf (accessed May 5, 2008).

> The aircraft carrier is the cornerstone of naval aviation, in the past ten years alone, large-deck carriers have been called upon to respond to, and engage in, over 20 separate international crises, ranging from deterring Iraqi aggression (Operations Northern and Southern Watch) to thwarting attacks on civilians in the former Republic of Yugoslavia (Operation Deliberate Force). In OEF, carrier-based air wings flew strike and combat support missions against Taliban and Al-Qaeda terrorist forces in Afghanistan. In OIF, the carriers operated around-the-clock, immune to hazards such as sandstorms that grounded land-based aircraft. Organic air wings provided strike, electronic attack, airborne early warning, ISR, and other combat capabilities, clearly demonstrating the role of the large-deck aircraft carrier as a permanent fixture in our national defense strategy.[8]

Questions arise nonetheless: Is the role of the large-deck aircraft carrier a permanent fixture in our national defense strategy, given the primarily asymmetric nature of America's modern and predicted threats? How should the U.S. Navy enable sea-based air power in the face of an evolving non-traditional threat? Is CVN-21 the appropriate transformational carrier design to meet U.S. Navy operational air requirements for the navy after next? Would the U.S. CVN fleet and the National Military and Maritime strategy be better served with a mixture of smaller complementary aircraft carriers that could potentially provide a higher degree of flexibility and distributed capability in high and low intensity conflict? When

[8] James M. Zortman, Walter B. Massenburg and Kilkline, Thomas J., Jr, "Naval Aviation Vision 2020," Naval Aviation Enterprise, http://depts.washington.edu/uwnrotc/intro/Naval_Aviation_Vision_2020.pdf (accessed May 15, 2008).

considering conflicts of the past 25 years (when the U.S. first intervened in Lebanon), up to the present, it can be argued that CVN's did not, in fact, deter factions in Lebanon, the Balkans, Saddam in 1990 and 2003, the Iranians, or Al Qaeda, despite the common assertion that CVN's provide a means of deterrence to would-be adversaries. Just when have CVN's had this vaunted deterrent effect?[9] Are there cost effective and strategically viable alternatives? For example, might a larger number of less costly aviation-capable amphibious assault ships with accompanying Marines be a viable substitute? The following three chapters will examine historical case studies of aircraft carrier employment in combat operations that include Operation ENDURING FREEDOM (OEF), Operation IRAQI FREEDOM (OIF) and the Falklands War from a lens of projecting power, deterrence and compellance, COIN and the GWOT. The intent is to compile data and analysis from the case studies to develop a proposal for the evolution of aircraft carrier design strategy.

Operation ENDURING FREEDOM is a unique case due to an initial absence of suitable operating air bases close enough to the campaign area to make large-scale use of land-based fighter aircraft possible. Land-locked, the remoteness of Afghanistan presented a theater more than 400 nautical miles from U.S. aircraft carriers operating in the North Arabian Sea.[10] Alongside surface ships and long range Air Force bombers, this is a classic case of an aircraft carrier's

---

[9] John Arquilla, Militaries and Technological Change, SO4104, 2007.

[10] Benjamin S. Lambeth, *Air Power Against Terror, America's Conduct of Operation Enduring Freedom* (Santa Monica, CA 90407-2138: RAND Corporation, 2005).

ability to arrive early to the fight while negotiations for forward basing arrangements could be secured for land-based fighter aircraft. Despite this and CAOC statistics that indicate U.S. carrier fighters flew three-quarters of all OEF sorties, the preponderance of ordnance, particularly precision guided munitions, were delivered by the U.S. Air Force. This campaign also highlights the use of SOF units operating with Afghan forces supported by combat aircraft. Despite the campaign being lauded an overwhelming success, most of the top Taliban leaders and key Al Qaeda figures survived the war and eluded capture.[11] Taliban and al Qaeda forces proved formidable foes that air power alone could not have neutralized.

The opening three weeks of high intensity combat during Operation IRAQI FREEDOM put to the test the U.S. Navy's Fleet Response Plan (FRP) of surging aircraft carriers, breaking lock with the established six month deployment rotation. Rather than forward presence, the FRP's intent was to provide forward presence with a purpose.[12] The U.S. Navy massed six carriers and demonstrated versatility by employing JDAM strikes in a sandstorm, and provided close air support for troops-in-contact. The air component kept the ground campaign on the offensive during needed pauses for logistics support or unexpected ones due to weather. It protected supply lines by making it all but impossible for

---

[11] Carl Conetta, *Strange Victory: A Critical Appraisal of Operation Enduring Freedom and the Afghanistan War* (Cambridge, Massachusetts: Project on Defense Alternatives, 2002), 87 (accessed April 15, 2008).

[12] Ham, Walter T. IV, "'Presence with a Purpose' - CNO Explains Fleet Response Plan," U.S. Navy, http://www.navy.mil/search/display.asp?story_id=9060 (accessed May 15, 2008).

the Iraqis to mass their forces.[13] Generating enough sorties to meet mission needs was never a problem. The six committed carriers and their embarked air wings could generate sorties faster than the CAOC could generate targets.[14] Within a month, high intensity conflict came to an end. What followed was a quagmire of insurgency and internecine tribal warfare still under way. The issue is the role the super carrier plays in supporting counterinsurgency. During the past five years of U.S. presence in Iraq, how have carrier aircraft deterred insurgency? Are there more cost-effective ways to provide the modes and contributions made by carrier aircraft for stability operations? This case considers these issues and more.

The Falklands War is a campaign whose success was achieved, in part, with two conventionally powered medium aircraft carriers using STOVL aircraft. Of interest, in one of the more significant events of the conflict, airpower played no part. A British attack submarine sank an Argentine cruiser. Airpower was, however, affected by it. This case exemplifies the ability of a force to successfully combat a numerically larger adversary with medium conventional carriers using STOVL aircraft. It also brings to mind the effects posed on an adversary that’s faced with a viable submarine threat.

---

[13] Rebecca Grant, "Decisive Combat Operations" In *Battle-Tested, Carrier Aviation in Afghanistan and Iraq* (Washington DC 20002: IRIS Press, 2005), 149-150-173.

[14] Benjamin S. Lambeth, *American Carrier Air Power at the Dawn of a New Century* (Santa Monica, CA 90407-2138: RAND Corporation, 2005).

II. OPERATION ENDURING FREEDOM

The requirement for a credible deep-attack force capable of reaching the remotest part of Southwest Asia where the U.S. initially had no access to forward land bases confronted the Navy's carrier force with a uniquely demanding challenge. At the time of the 9/11 attacks, the aircraft carriers USS *George Washington* (CVN-73) and *John F. Kennedy* (CV-67) were engaged in predeployment workups off the U.S. east coast, the *John C. Stennis* (CVN-74) and *Constellation* (CV-64) were similarly preparing for deployment off the California coast. *Kitty Hawk* (CV-63) was at dockside in her home port of Yokosuka, Japan. *Enterprise* (CVN-65) was outbound from the Southwest Asian area of operations off the coast of Yemen heading for home as she neared the end of a six-month deployment to the Persian Gulf. *Carl Vinson* (CVN-70) was inbound to CENTCOM's AOR off the southern tip of India to relieve *Enterprise*.[15] These ships and numerous others were ordered to their highest state of readiness in the immediate aftermath of the attacks. DoD and the carrier battle group commanders also initiated moves to update contingency plans for naval strike operations in the most likely areas of possible U.S. combat involvement worldwide. In a 2005 RAND report titled *American Carrier Air Power at the Dawn of a New Century,* Benjamin Lambeth states "the *Enterprise* CO turned his ship around upon learning of the terrorist attacks and was subsequently ordered to remain in the region for an indefinite length of

[15] Benjamin S. Lambeth, *Air Power Against Terror, America's Conduct of Operation Enduring Freedom*, 111-411.

time. *Carl Vinson* was rerouted from her previously assigned operating area to join *Enterprise* in the North Arabian Sea. That doubled the normal number of carrier air wings ready for tasking in that portion of CENTCOM's AOR. *Theodore Roosevelt* (CVN-71) was slated to sail from Norfolk the week of September 19, a week after 9/11. Once she was under way, the Navy would have almost half, five of its 12 carriers headed toward CENTCOM's AOR simultaneously."[16] Concurrently, *Kitty Hawk* departed Yokosuka without her full air wing aboard to provide what later came to be referred to as a sea based "lily pad" from which U.S. special operations forces (SOF) teams would be staged into Afghanistan. By October 1, *Carl Vinson* and *Enterprise* were in position to commence strike operations, with *Theodore Roosevelt* expected to be ready to join them in the North Arabian Sea within a week. By this time, the overall number of U.S. aircraft in the region had grown to between 400 and 500, including 75 on each of the Navy's three carriers on station.[17]

Within less than a month after 9/11, CENTCOM organized, planned, and initiated a joint and combined campaign to bring down the Taliban theocracy that had provided bin Laden and his terrorist operation safe haven there since 1998. OEF would be characterized by air attacks against Taliban and al Qaeda military assets and personnel, integrated with SOF on the ground that worked with indigenous Afghan opposition groups to provide allied strike aircraft with timely target location, identification, and validation.

---

[16] Benjamin S. Lambeth, *Air Power Against Terror, America's Conduct of Operation Enduring Freedom*, iii-411.

[17] Lambeth, *American Carrier Air Power at the Dawn of a New Century.*

As part of the joint force, carrier-based Navy and Marine Corps strike fighters operating from stations in the North Arabian Sea initially made up the preponderance of sorties in lieu of Air Force land-based fighter and attack aircraft because of an absence of suitable operating locations close enough to the war zone at the opening of hostilities. To be sure, aircraft carriers did not operate alone; Tomahawk cruise missiles, a total of fifty-three[18], were launched from British and U.S. submarines and ships, U.S. Air Force bombers such as the B-1B Lancer, B-2 Spirit, and B-52 Stratofortress were also involved in the initial wave and throughout the air campaign.[19] Nonetheless, the Navy's carrier air wings that were committed to the campaign provided CENTCOM with a valiant contribution to combat operations throughout the war. Strike missions from the carriers entailed distances to target of 600 nautical miles or more, with an average sortie length of more than four and a half hours and required a minimum of two, often many more, in-flight refuelings each way to complete the mission.[20] There were also two amphibious ready groups built around the 15th and 26th Marine Expeditionary Units and the large-deck amphibious ships *Bataan* and *Pelelieu.*

---

[18] Norman Friedman, *Terrorism, Afghanistan and America's New Way of War* (291, Annapolis, MD 21402: US Naval Institute Press, 2003), 304.

[19] Ian C. McCaleb, "Defense Officials: Air Operation to Last 'several Days'," CNN, http://archives.cnn.com/2001/US/10/07/ret.attack.pentagon/ (accessed May 07, 2008).

[20] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 52-53-58.

These two units would later be the principal U.S. ground force in southern Afghanistan, and as such would play an important role after the fall of the Taliban.[21]

Throughout the first five days, Navy fighters dropped 240 JDAMs and laser-guided bombs (LGBs) altogether, as well as one I-2000 BLU-109 hard-structure munition. A week later, in three consecutive days of the war's heaviest bombing to date, allied aircraft attacked a dozen target sets, including Taliban airfields, AAA positions, armored vehicles, ammunition dumps, and terrorist training camps. Those attacks involved some 90 Navy and Marine Corps fighters operating from all three air wings that were by then on station aboard *Enterprise*, *Carl Vinson*, and *Theodore Roosevelt*. The farthest distance of 750 nautical miles from carrier to targets in northern Afghanistan made for sorties lasting, on occasion, as long as ten hours, often with multiple mission tasking. These missions entered the annals of naval aviation history as the longest-range combat sorties ever flown by carrier-based aircraft.[22]

In effect, the initial air campaign, which concentrated on vital targets deep in Afghanistan, was a test of the pure form of network-centric theory, the idea that attacking a few key targets (the "center of gravity") could and would be decisive. It failed. The effects of the first weeks of the air campaign were limited, at best. The Taliban did not

---

[21] Friedman, *Terrorism, Afghanistan and America's New Way of War*, 304.

[22] Lambeth, *Air Power Against Terror, America's Conduct of Operation Enduring Freedom*, iii-411.

collapse instantly.[23] In a 2002 Project on Defense Alternatives monograph by Carl Conetta titled *Strange Victory: A Critical Appraisal of Operation Enduring Freedom and the Afghanistan War,* the author states "through the end of October the air campaign did not either compel Taliban cooperation or disintegrate the movement. During most of this period air attacks focused largely on air defense, command and control, political, and infrastructure targets as well as military bases and storage sites. What could have been drawn from the experience of Operation Allied Force was that the lever of air power requires a fulcrum on the ground."[24]

The available ground fulcrum in Afghanistan, the Northern Alliance, was regarded initially as unlikely to produce the desired political outcome, should it sweep to victory. Thus, support for the Alliance's war effort was minimally configured to sustain their front and pressure the Taliban without enabling a rapid Alliance sweep. Of course, the only completely reliable fulcrum would have been U.S. and coalition troops on the ground in larger numbers. But practical and diplomatic problems precluded this option, at least in the chosen time frame. Conetta adds,

> for its part, the Northern Alliance, probably following Russian advice, was reluctant to risk its troops, assets, and power in vigorously attacking well-defended Taliban positions, unless the United States provided more visible support. The mid-October shortcomings of the Northern Alliance's first attempt to take Mazar-i-Sharif exemplified the stalemate in the north. This and

---

[23] Conetta, *Strange Victory: A Critical Appraisal of Operation Enduring Freedom and the Afghanistan War*, 87.

[24] Ibid., 87, 15.

> the apparent resilience of the Taliban elsewhere prompted a process of questioning and re-orienting America's strategy.[25]

Nonetheless, the administration's initial response to the difficulties during the second week of war was not to unleash the Alliance but to increase the intensity of bombing all around. This also increased the rate of civilian casualties and elicited a new round of international criticism. Essentially, the war effort became a race between the cumulative effects of bombing and the international disapprobation that this incurred. Still, through the end of October, the air campaign was no more effective than a lever without a fulcrum. However, when a second element, a more substantial force on the ground was added, the strategy proved successful. Thus the Northern Alliance coalition troops made victory in much of Afghanistan possible-when they were combined with a network-centric strike campaign. The glue holding together the Northern Alliance and U.S. strike force was small A-Teams (ODA) of U.S. Special Operations Forces, integrated with Air Force enlisted tactical air controllers (ETACs) or combat controllers (CCTs), and CIA operatives. For Northern Alliance commanders, these teams were the visible face of U.S. commitment to the war. Without them, the bombers would have been blind to the most important targets.[26] It showed that the U.S. was willing to risk its own personnel in support of the Northern Alliance. The significance of the later Marine

---

[25] Conetta, *Strange Victory: A Critical Appraisal of Operation Enduring Freedom and the Afghanistan War*, 87, 16.

[26] Friedman, *Terrorism, Afghanistan and America's New Way of War*, 304.

Corps occupation of Forward Operating Base Rhino was similar. Demonstrating a U.S. commitment to the war helped convince Afghans to fight alongside the United States. No remote attack could be expected to have the same effect.

The first phase of the bombing in OEF ended on December 18. The week that followed was the first since the war began on October 7 in which no bombs were dropped, although numerous armed F-14s, F/A-18s, B-52s, and B-1s continued to orbit on call over Kandahar and Tora Bora to attack any possible al Qaeda targets that might emerge. Those aircraft were joined by Italian Navy Harriers operating off the carrier *Garibaldi* and the French Super Etendard fighters from the carrier *Charles de Gaulle*. By mid-January 2002, offensive air operations over Afghanistan had largely been reduced to a trickle, and only one in ten strike sorties dropped munitions.[27] Those on the ground did not always need air support, but they did have to be sure that it would be available whenever it was needed. Thus, often aircraft did return to their bases or carriers with weapons still onboard.[28]

Two months after the rout of the Taliban and the installation of the interim successor government of Hamid Karzai, U.S. forces met their single greatest challenge of the war in an initiative that came to be known as Operation Anaconda. The Shah-i-Kot valley area in eastern Afghanistan near the Pakistani border had been under surveillance by CENTCOM ever since early January 2002, prompted by

---

[27] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 52-53-58.

[28] Friedman, *Terrorism, Afghanistan and America's New Way of War*, 304.

intelligence reports that the Taliban and al Qaeda forces were regrouping there in an area near the town of Gardez. Over time, enemy forces continued to mass in the area, to a point where it appeared as though they might begin to pose a serious threat to the Karzai government. At that point, the U.S. Army's Combined Joint Task Force Mountain began planning an operation aimed at surrounding the Shah-i-Kot valley with overlapping rings of U.S. and indigenous Afghan forces, the intent being to bottle up and capture or kill the several hundred al Qaeda fighters who were thought to have congregated in the area. Approximately 150-200 fighters were believed to be wintering and possibly preparing for a spring offensive in the valley. The signal intelligence also raised the possibility that high-value targets (HVTs) were present in the valley. These HVTs were believed to be Osama bin Laden, Ayman al-Zawahiri and Mullah Omar, the leaders of al-Qaida and the Taliban, respectively. In late January and February plans were drawn up to assault the Shah-i-Kot Valley using Afghan military forces (AMF) advised and assisted by U.S. special operators. The plan called for an attack on the valley, along with units positioned in the mountains to the east to prevent escape into Pakistan. U.S. conventional infantry would be utilized, consisting of the 3rd Brigade ("Rakkasans") of the 101st Airborne Division, and 1st Battalion, 87th Regiment (1-87) of the 10th Mountain Division to secure these blocking positions. In keeping with established strategy in Afghanistan, fire support was to be provided by USAF and carrier aircraft, rather than artillery.

The amount of conventional assets allowed in Afghanistan was limited by CENTCOM and civilian defense

leadership.[29] The final plan foresaw two major forces: TF Hammer and TF Anvil. TF Hammer consisted of AMF and special operators as the primary effort to assault the Shah-i-Kot Valley. TF Anvil consisted of TF Rakkasan and the 1-87 to set up blocking positions and prevent enemy forces from escaping. Special operations teams from the Advanced Force Operations (AFO) detachment were to provide on-location reconnaissance in the Shah-i-Kot Valley for the operation.

Carrier Air Wing (CVW) NINE aboard *John C. Stennis*, which had taken up station in the Afghan war zone in mid-December 2001, played a major part in Operation Anaconda, as did CVW-7 on *John F. Kennedy*. Along with strike fighter missions, E-2C Hawkeyes provided airborne command and control inside Afghanistan, and EA-6Bs provided 24-hour alert jamming support for CJTF Mountain. By the end of the first week of Anaconda fighting, against a more formidable enemy than expected, allied air attacks, in support of the embattled ground troops, became more consistent and sustained. Al Qaeda and Taliban strategy veered towards fleeing, many of which escaped into neighboring areas, allowing friendly forces to seize control of more terrain. Carrier-based F-14s and F/A-18s contributed significantly to this support. In addition, 16 Super Etendards from the French Navy's carrier *Charles de Gaulle* took part in Anaconda by providing close air support, along with French Mirage 2000Ds operating out of Manas airfield in Kyrgyzstan.

The intelligence estimate of al Qaeda fighters for Operation ANACONDA was incorrect, and varied from a few

---

[29] Sean Naylor, *Not a Good Day to Die: The Untold Story of Operation Anaconda* (New York, NY 10014: The Berkley Publishing Group, 2005), 415 (accessed April 15, 2008).

hundred to a few thousand. The operation was considered to be purely within the Army's purview and apparently was not coordinated adequately with the coalition's air component; the Combined Air Operations Center (CAOC) was not made aware of the operation until after the generation of the OPORD (operation order)[30], just before it was to begin.[31] There was a divergence between Army and Air Force concepts of operations. The Army veered towards combined arms operating tactically, that is, as a force moves into contact with the enemy, Army aircraft (helicopters) operate in close support, under control of a ground commander. The favored Air Force operating technique is preparation of the battle space by pre-battle bombardment. In this case, pre-battle bombardment was rejected on the grounds that it would sacrifice the element of surprise. As it was, there was no surprise at all.[32] And as such, the air component was not appropriately incorporated into the Operation ANACONDA planning until very close to execution. The effort began to unravel almost from the March 2, 2002, start, as three elements of the encircling coalition forces ran into unexpectedly tough resistance. The following day, U.S. aircraft dropped 270 bombs on Taliban and Al Qaeda forces. Nonetheless, conditions deteriorated, as al Qaeda was on familiar turf

---

[30] An OPORD is the product of extensive combatant commander execution planning. The commander's OPORD is published with a major force list, instructions for the conduct of operations in the objective area, and the logistic and administrative plans for support of an operation. For further information regarding aspects of an OPORD, see Joint Publication 5-00.1.

[31] Walter J. Boyne, "Apaches at Anaconda" In *Operation Iraqi Freedom: What Went Right, what Went Wrong, and Why* (New York, NY 10010: Tom Doherty Associates, LLC, 2003), 261-262-265.

[32] Friedman, *Terrorism, Afghanistan and America's New Way of War*, 304.

and had ample supplies of weapons and munitions. On March 4, the day the battle was to have been concluded, an attempt was made to insert troops by helicopters near a point in the mountains called Takur Ghar. This appeared to be a perfect location for an observation post; unfortunately, the point was under observation of al Qaeda fighters positioned in a well-concealed bunker system just over the ridge. The troop insertion was rebuffed with heavy fire and resulted in a friendly casualty. Two other attempts to land helicopters also faced heavy fire and resulted in casualties with a rescue situation at hand. The rescue effort came with two MH-47Es and a twenty-three man Ranger quick reaction force moving into the same hot spot near Takur Ghar. Al Qaeda forces were waiting, one MH-47E was shot down by a RPG as it attempted to land near the site. Four men were killed at once and others wounded. The rangers deployed to attack the al Qaeda bunkers, calling for air support. Air Force aircraft arrived within minutes to bomb and strafe the bunker area. Air Force F-15E Strike Eagles were called in to strafe the al Qaeda positions at the top of the ridgeline, an area only a few yards from coalition lines and provided CAS for several hours.

By the time the battle of Takur Ghar ended, eight men had died. Later in the operation, air support expanded to include B-1B, B-2A, F-15, AC-130, A-10, B-52, F/A-18 and Apache helicopters. In *Battle-Tested: Carrier Aviation in Afghanistan and Iraq,* Rebecca Grant states “in this crisis it was the two carriers off Pakistan that provided the bulk of the fighter sorties – an average of about 32 strike sorties per day penetrating deep into eastern

Afghanistan,"[33] and that, "bombs available outnumbered targets…with the carriers providing an average of over 30 sorties per day, the CAOC was always 'excess to need' in terms of sorties available."[34] More than 2,000 bombs were dropped on al Qaeda positions from B-52s and F/A-18s. What had been planned as a seventy-two hour operation lasted another fourteen days before the remnants of the dug-in enemy either were killed or managed to escape.[35] Operation ANACONDA turned out to be an acid test of land and air component cooperation in a pitched fight. The al-Qaeda and Taliban forces holed up in prepared defensive positions in the 10,000-foot mountains and rained mortars and small arms fire down on the soldiers, sailors, and airmen holding blocking positions below. Over the next two weeks, bombers, fighters, helicopters and AC-130 gunships delivered close air support (CAS) into the postage-stamp size battle area measuring about 8 nautical miles (nm) x 8 nm. De-confliction and coordination of this "fire support" proved challenging with friendly troops and controllers in a small area. In the air, funneling the strikes in was just as intense, and strike aircraft reported several near misses as one pulled up from an attack run while another rolled onto the target. After initial contact sparked heavy fighting, air controllers attached to ground forces or airborne FAC-A's called in airpower to provide close air support.
Grant states that "one of the biggest challenges was

---

[33] Rebecca Grant, *Battle-Tested: Carrier Aviation in Afghanistan and Iraq* (Washington, D.C.: IRIS Press, 2005), 92.

[34] Ibid., 103.

[35] Boyne, *Apaches at Anaconda*, 261-262-265.

preventing mid-air collisions…and with a steady supply of strike aircraft…directing combat aircraft was still the limiting factor."[36]

From the start of hostilities on October 7, 2001, until the period of major combat that ended in mid March of 2002, six carrier battle groups participated in OEF. Together, they conducted around-the-clock combat operations against enemy forces in a landlocked country more than an hour and a half's flight north of the carrier operating areas in the Arabian Sea. Those operating areas were repositioned from time to time to meet changing tactical requirements. Lambeth indicates, "eventually, however, carrier-launched air missions came to average a distance of 600 nautical miles from their stations some 100-120 nautical miles south of the Pakistani coast to central Afghanistan and another 150-200 nautical miles to northern Afghanistan."[37] Throughout the war, the Navy maintained at least two carriers on station in the North Arabian Sea. "When *Theodore Roosevelt* arrived on station on October 17, 2001, to relieve *Enterprise*, CENTCOM's CFACC had three carrier air wings available to him for nearly a week. The number of carriers deployed to the AOR did not drop to one until *John C. Stennis* departed for home on April 18, 2002."[38]

"Throughout the war, carrier-based strike assets in all participating air wings averaged forty actual shooter

---

[36] Grant, *Battle-Tested: Carrier Aviation in Afghanistan and Iraq*, 101.

[37] Lambeth, *Air Power Against Terror, America's Conduct of Operation Enduring Freedom*, 80.

[38] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 21.

(delivered ordnance) sorties a day per carrier."[39] The remaining sorties that made up the daily baseline of 90 per air wing entailed tanker, electronic warfare, command and control, and other mission support.[40] After the war ended, "one-third of all Navy strike sorties had been directed against interdiction targets with the remaining two-thirds providing air support to friendly ground forces. Around 80 percent of the carrier-based missions that dropped ordnance did so against targets that were unknown to the aircrew before launch,"[41] of which the key to execution of the mission rested on aircrew connecting with the network on the ground. "Of the Navy sorties that delivered ordnance, 84 percent were assessed as having hit at least one target and an average of two desired mean points of impact (DMPI) were hit by Navy sorties that dropped ordnance. Of all Navy munitions dropped, 93 percent were either satellite-aided or laser-guided. Targets were attacked at all hours of the day by navy strike fighters, with most weapon impacts occurring during the first three hours of daylight."[42]

Each carrier conducted flight operations for roughly 14-16 hours a day, with overlaps as needed to keep an average of three two-plane section of fighters constantly over Afghanistan for on-call strikes against emerging targets. Of all missions flown, 25 percent lasted longer than five and a half hours, with some F/A-18 missions

---

[39] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 21.

[40] Ibid.

[41] Ibid.

[42] Lambeth, *Air Power Against Terror, America's Conduct of Operation Enduring Freedom*, 23.

lasting up to ten hours. The extensive distance between the carrier operating area and target area made for an operating environment that was extremely unforgiving. Aircrews would occasionally find themselves in a “tank or die” situation, with tanker hook-ups occurring after an aircraft’s fuel state had fallen so low that the aircraft would not have been able to make it to Pakistan in the event that the tanker had gone “sour” (unavailable).[43]

As indicated by statistics compiled by the CAOC (Combined Air Operations Center of USCENTAF, the air enabler of CENTCOM) during the 76 days of bombing between October 7, when OEF began, and December 23, when the first phase of the war ended after the collapse of the Taliban, some 6,500 strike sorties were flown by CENTCOM forces altogether, out of which approximately 17,500 munitions were dropped on more than 120 fixed targets, 400 vehicles and artillery pieces, and a profusion of concentrations of Taliban and al Qaeda combatants. Of the total number of allied munitions expended, 57 percent were precision-guided munitions. “U.S. carrier-based strike fighters accounted for 4,900 of the 6,500 strike sorties flown, making up 75 percent of the total sorties during that period, but delivered less than 30 percent of the ordnance. USAF flew 25 percent of the strike sorties but delivered over 70 percent of the ordnance.”[44] Maritime forces accounted for more than half of all

---

[43] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 27.

[44] Anthony H. Cordesman, *The Lessons of Afghanistan: War Fighting, Intelligence, and Force Transformation*, Vol. 24, #4 (Washington, D.C.: Center for Strategic and International Studies, 2002), 5.

precision munitions expended.[45] To be sure, Air Force heavy bombers played a prominent part in OEF, by flying from the British island base of Diego Garcia in the Indian Ocean and, in the case of the B2 stealth bomber (which flew six missions against the air defenses of the ruling Taliban during the campaign's first two nights), all the way from Whiteman AFB, Missouri, and back. Air Force bombers dropped nearly three-quarters of all the satellite aided GBU-31 joint direct attack munitions (JDAMs) that were delivered throughout the war. Air Force F-15E and F-16 fighters also contributed materially to strike operations after the tenth day. "For its part, although the Air Force flew only a quarter of the strike missions, its aircraft dropped 12,900 munitions, more than 70 percent of the total. The heavy B-52's and B-1's flew only 10 percent of the total strike missions, yet they delivered 11,500 of the 17,500 of the munitions, accounting for 65 percent of the total and 89 percent of all the munitions dropped by the Air Force."[46]

"As many in the naval aviation community were among the first to acknowledge, without nonorganic Air Force and RAF tankers to provide inflight refueling support, the Navy's carrier air wings could not have participated in OEF beyond the southernmost target areas in Afghanistan."[47] Of particular interest, was the coupling of naval air

---

[45] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 52-53-58.

[46] Benjamin S. Lambeth, *Combat Pair, the Evolution of Air Force-Navy Integration in Strike Warfare* (1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138: RAND Corporation, 2007), http://www.rand.org (accessed 15 February 2008).

[47] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 29.

capabilities with SOF, for example, Navy F-14s transmitted and received imagery from allied SOF units on the ground using the aircraft's Fast Tactical Imagery (FTI). That system coupled the fighters for the first time with SOF teams deployed with Northern Alliance forces around Kabul. The SOF teams communicated with F-14 crews via laptop computers. FTI provided a day and night standoff transmission system enabling F-14 crews to send and receive imagery to and from SOF units, thus giving the aircraft a near real time two-way imagery capability. Imagery from the ground could be sent back to the carrier for either clearance to attack, if needed, or for almost instant post strike battle-damage assessment. Joint coordination allowed SOF units to provide fine-resolution target imagery to the F-14s. Such use of the F-14s FTI by U.S. SOF teams on the ground allowed for a substantial shortening of what was informally called the kill chain. In addition to the above, the use of the *Kitty Hawk* as a staging base for SOF helicopters demonstrated versatility of the ship by showcasing its potential for performing missions other than launching fixed wing aircraft.[48]

A. OEF ANALYSIS

Could alternative forms of sea-based air power substitute the combat effects provided by CVN's? *Kitty Hawk* demonstrated versatility performing as a "lily pad" for SOF units. Other sea based platforms, such as amphibious ships, could have performed that function equally as well. A CVN is not needed to perform this mission. Although ingenious in

[48] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 29.

flexibility, this is an issue of its intended utilization. Its astute to have innovatively used this ship to deliver SOF ashore, but to use this instance in asset flexibility as an example and means to justify further procurement of large-deck carriers in the future leaves doubt as to whether this is the most efficient use of its utilization. In a 2006 RAND report that explores new combat and non-combat roles and missions for U.S. carriers, the authors cite this case as an example of flexibility of a CV to function as a SOF insertion platform into Afghanistan.[49] The report also states "the need for flexibility requires a more modular approach. Current ships could be reconfigured, but at some cost, to increase their ability…future ships, particularly the soon-to-be-built CVN-21, could be modified while still in the design phase to increase their ability to switch missions and aircraft types,"[50] the report continues by making a subtle, but important note in stating that "the concept of increased modularity and flexibility for current and future U.S. Navy aircraft carriers could also be applied to the next large amphibious ships – the LHA-R class…,"[51] this is an option that should be considered, it would provide for more distribution and tailoring of the sea-based air package to a permutating combat situation.

Ships such as the new USS *San Antonio* class LPD-17 conduct amphibious assault, special operations, and expeditionary warfare operations in support of the war on

---

[49] Gordon et al., *Leveraging America's Aircraft Carrier Capabilities, Exploring New Combat and Noncombat Roles and Missions for the U.S. Carrier Fleet*, 27.

[50] Ibid.

[51] Ibid.

terrorism.[52] An LPD can launch or land up to four CH-46 Sea Knight helicopters; or up to two MV-22 Osprey tilt rotor aircraft simultaneously with room to spot four MV-22s on deck and one in the hangar. *Wasp* class LHD's are capable of providing aircraft to support SOF and troops in contact in an OEF type scenario as well. A typical complement of aircraft on an LHD is a mix of 25 helicopters and six to eight AV-8B Harriers. In a secondary sea control role the most likely mix is 20 AV-8B Harriers and four to six SH-60B Seahawk and MH-60S Knighthawk helicopters.[53] At full load an LHD displaces 41,000 tons. In the future these ships will support the MV-22 Osprey and the STOVL F-35B strike fighter aircraft. The emphasis associated with these missions is to land elements of a Marine landing force in amphibious assault operations; they are, nonetheless, more than capable in participating in the joint & coalition arena in support of Marines, SOF and conventional forces on the ground. This is an untapped capability well worth utilizing much more extensively; there are eighteen active amphibious ships

---

[52] Kurt A. Kastner, "USS San Antonio LPD-17 CO's Welcome Aboard," USS San Antonio (LPD 17), http://www.san-antonio.navy.mil/pco_letter.htm (accessed March 9, 2008).

[53] Jane's Information Group, "Wasp Class: Amphibious Assault Ships (LHDM)," Jane's Information Group, http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/jfs/jfs_3567.htm@current&pageSelected=allJanes&keyword=tank&backPath=http://search.janes.com/Search&Prod_Name=JFS&keyword= (accessed March 11, 2008).

of the LHD/LHA/LPD type, with USS *Makin Island* (LHD 8) under construction[54], and seven more LPD's slated to be constructed.[55]

To date, CTOL aircraft have proven to be the most capable assets of carrier air wings. V/STOL aircraft, such as the AV-8B Harrier, are considered inferior in terms of endurance, fighter/attack capability and carry capacity. The Joint Strike Fighter (JSF), now in advanced development for the U.S. Navy, Marine Corps and Royal Navy, may represent a giant step in erasing the advantages of the CTOL fighter. Taking full advantage of numerous developments in structural materials, engine and airframe design, and low-observable attributes, the JSF and future derivatives may eventually permit the use of smaller carrier platforms to perform many or even all of the missions assigned to present-day large-deck carriers.[56] The F-35B (V/STOL version) is a fifth generation fighter/attack platform being developed to be the world's premier strike aircraft through 2040. It is intended that its air-to-air capability will be second only to that of the F-22 Raptor. Specifically, the F-35's requirements are that it be: four times more effective than legacy fighters in air-to-air combat, eight times more effective in

---

[54] U.S. Navy Fact File, "Amphibious Assault Ships - LHA/LHD/LHA(R)," U.S. Navy, http://www.navy.mil/navydata/fact_display.asp?cid=4200&ct=4&tid=400 (accessed June 15, 2008).

[55] U.S. Navy Fact File, "Amphibious Transport Dock - LPD," U.S. Navy.mil, http://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=600&ct=4 (accessed June 15, 2008).

[56] Peter Hore and Thomas J. Hirschfeld, eds., *Maritime Aviation, Light and Medium Aircraft Carriers into the Twenty First Century* (The University of Hull Press, Cottingham Road, Hull: Royal Navy Defence Studies, 1999), 205.

air-to-ground battle combat, and three times more effective in reconnaissance and suppression of enemy air defenses. These capabilities are to be achieved while still having significantly better range and a smaller logistical footprint than their legacy counterparts.[57] The F-35 stands to significantly improve the combat striking power of amphibious ships thus making them a potential viable substitute to the costlier super carrier. These ships could be configured to conduct such operations similar to that seen in OEF, supported by long range bombers, if required. V/STOL, particularly the JSF, have reached a level of maturity that warrants serious reconsideration for the need of solely CTOL and large-deck CVNs.

Indeed, carriers provided air bases for strike aircraft while negotiations for the use of land-based aircraft delayed their initial participation in the campaign. Aircraft carriers mitigated this logistical and political problem and provided the strike-fighters, and thus validated one of its principal missions. Despite this, U.S. based long range strategic bombers, along with additional strategic and tactical aircraft near or within the theater, did arrive in as quickly as it might have taken an aircraft carrier, possibly sooner, thus the campaign would not have been significantly delayed or undermined had a smaller conventional carrier required a negligible amount of additional time to arrive on station. Therefore, it is possible to suggest that OEF could have been conducted

---

[57] John E. Pike, "F-35 Joint Strike Fighter (JSF) Lightning II," GlobalSecurity.org, http://www.globalsecurity.org/military/systems/aircraft/f-35.htm (accessed March 11, 2008).

without super carriers, although, it may have prolonged achieving the desired combat effects, due to the potentially smaller number of sorties generated by a smaller deck and air wing. A note regarding overhead air combat coverage in support of troops on the ground is that, when “kill boxes” are established, a high number of sorties are required to provide the persistent coverage necessary for support of ground troops in order to prosecute time-sensitive pop-up mobile and fleeing targets, that, due to its sortie generation capability, a large deck CVN can provide. In this case, the generation of sorties in support of the campaign was never an issue; difficulty arose as a result of disconnected planning by the land and air components during Operation ANACONDA. Throughout the war, carrier-based strike aircraft in all participating air wings averaged around 40 sorties a day that delivered ordnance per carrier.[58] CVNs could have been substituted for this. The benefits of distributed capability, flexibility and the potential for reduced procurement and operating costs of a medium or light carrier make it well worth consideration. Another significant factor is post hostility operations, the high intensity portion of this campaign lasted three weeks; sea-based air power coverage for this phase should be covered by an air capable ship that is better suited for low to medium intensity operations in support of ground forces that compliments their indigenous air and UAV assets.

The National Maritime Strategy of the U.S. titled *A Cooperative Strategy for 21st Century Seapower* states

---

[58] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 22.

maritime forces are to be “globally distributed mission-tailored maritime forces. The Sea Services will establish a persistent global presence using distributed forces that are organized by mission and comprised of integrated Navy, Marine Corps, and Coast Guard capabilities. This global distribution must extend beyond traditional deployment areas and reflect missions ranging from humanitarian operations to an increased emphasis on counter-terrorism and irregular warfare. Our maritime forces will be tailored to meet the unique and evolving requirements particular to each geographic region, often in conjunction with special operations forces and other interagency partners. In particular, this strategy recognizes the rising importance and need for increased peacetime activities in Africa and the Western Hemisphere.”[59] By these standards, with a view to a broader global presence, it makes sense for sea-based airpower to evolve and be procured for maximum distribution and flexibility in the form of medium and/or light carriers complementing super carriers, as required.

[59] James T. Conway, Gary Roughead and Thad W. Allen, "A Cooperative Strategy for 21st Century Seapower," U.S. Navy & Marine Corps, U.S. Coast Guard, http://www.navy.mil/maritime/MaritimeStrategy.pdf (accessed May 15, 2008).

THIS PAGE INTENTIONALLY LEFT BLANK

III. OPERATION IRAQI FREEDOM

In the run-up to combat operations, the complex maneuvering to position America's carrier fleet are described by Benjamin Lambeth in *Combat Pair: The evolution of Air Force-Navy Integration in Strike Warfare,*[60] "in January 2003, in one of the first major deployment moves for the impending war, the Secretary of Defense ordered the USS *Abraham Lincoln* carrier battle group to redeploy to the North Arabian Gulf from its holding area near Australia. The group was en route home from a six-month deployment in the Middle East but was directed to remain in CENTCOM's area of responsibility (AOR) as a contingency measure. The *Theodore Roosevelt* battle group, just completing a predeployment work-up in the Caribbean, was fresh to the fight and received orders to move as quickly as possible to reinforce *Constellation*, already in the Gulf, and *Harry S Truman* in the eastern Mediterranean, for possible operations against Iraq. A fifth carrier battle group led by USS *Carl Vinson* moved into the Western Pacific to complement two dozen Air Force heavy bombers that had been forward-deployed to Guam."[61] The author continues describing the build-up, "Air Force F-15Es were sent to Japan and Korea as backfills to cover Northeast Asia as USS *Kitty Hawk* moved from the Western Pacific to the North Arabian Gulf. In addition, the USS *Nimitz* battle group received deployment orders and got under way from San Diego in mid-January to wrap up an

---

[60] Benjamin S. Lambeth, *Combat Pair, the Evolution of Air Force-Navy Integration in Strike Warfare*, 3-129.

[61] Ibid.

already compressed three-week training exercise, after which it headed for the Western Pacific. Finally, the USS *George Washington* battle group, which had just returned to the East Coast in December following a six-month deployment in support of Operation Southern Watch, was placed on 96-hour standby alert, ready to return to Southwest Asia if required."[62]

In a 2005 RAND monograph, *American Carrier Air Power at the Dawn of a New Century,*[63] Lambeth further describes prepositioning of American forces, "by the end of the first week of March, the Navy had two carriers, *Theodore Roosevelt* and *Harry S Truman*, on station in the eastern Mediterranean and three more carriers, *Kitty Hawk*, *Constellation*, and *Abraham Lincoln* deployed in the North Arabian Gulf along with their embarked air wings, each of which included around 50 strike fighters. In addition, *Nimitz* was en route to the Gulf to relieve *Abraham Lincoln*, which had been on deployment for an unprecedented nine months."[64] The five carrier battle groups in position and ready for combat also included upward of 40 allied surface vessels and submarines armed with Tactical Land Attack Missiles (TLAM). In addition, Air Force F-15Es, F-16s, and F-117s were in place at Al Udeid Air Base in Qatar, tankers and various ISR platforms were forward-deployed to Prince Sultan Air Base, Saudi Arabia, and more than 200 additional Air Force aircraft, including F-15s and F-16s, were positioned at two

---

62 Benjamin S. Lambeth, *Combat Pair, the Evolution of Air Force-Navy Integration in Strike Warfare*, 3-129.

63 Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 52-53-58.

64 Ibid.

bases in Kuwait, with still more in Turkey, Oman, and the United Arab Emirates, all ready to carry out a multidirectional air attack. This fielded inventory of aircraft included 14 B-52s operating out of RAF Fairford in the United Kingdom and B-1 and B-2 bombers deployed to the Gulf region and Diego Garcia. Four of the B-2s that would take part in the war were deployed from Whiteman AFB to Diego Garcia. Of the F/A-18 contingent that was committed to the impending campaign, 60 were Marine Corps Hornets attached to the 3rd Marine Aircraft Wing and operating out of land bases in the region in anticipated support of the 1st Marine Expeditionary Force, in all, more than 700 Navy and Marine Corps, aircraft, roughly 40 percent, figured in the total of 1,800 allied aircraft altogether that were committed to the major combat phase of Iraqi Freedom. That number included 236 (15 percent) Navy and carrier-based Marine Corps F/A-18s, 56 F-14s, 35 EA-6Bs, 40 S-3s, and 20 E-2Cs. The Marine Corps also provided another 130 land-based fighters and 22 KC-130 tankers. Those combined assets contributed to a coalition total of 1,801 aircraft, 863 of which were provided by the Air Force, 47.9%.[65]

A late-breaking development that threatened to impair the effective conduct of impending air operations, especially by the two Navy carrier air wings on station in the eastern Mediterranean, was Turkey’s last-minute denial

[65] Lambeth, *Combat Pair, the Evolution of Air Force-Navy Integration in Strike Warfare*, 3-129.

of the use of its airspace by coalition forces.[66] Lambeth describes the implications that occurred because of this, “airspace denial promised to complicate strike operations since the carrier-based aircrews in the eastern Mediterranean had planned to transit Turkish airspace en route to targets in northern Iraq, with Air Force tankers supporting them out of Turkey’s Incirlik Air Base. The Navy also had planned to fire TLAMs through Turkish airspace into Iraq. Without access to that airspace, one alternative would have been to reroute the carrier-based strike aircraft and TLAMs into Iraq from the west through Israeli and Jordanian airspace, which also would have made for an even shorter route than transiting Turkey’s airspace. Some Bush administration officials pressed hard for the use of Israeli airspace if Turkey continued to balk on the issue. The Secretary of Defense, however, backed by his senior military advisers both in the Pentagon and at CENTCOM, concluded that attacking along a course that crossed the Jewish state would be too politically risky.”[67] The author further describes the high-level deliberations that ensued, “alternatively, were Turkey’s denial of needed access to persist, the two carriers in the eastern Mediterranean could redeploy through the Suez Canal to the Red Sea, with the result that they would be forced to launch aircraft several hundred miles farther away from Iraq. The land-based tankers slated to support them would have to operate from even more distant

---

[66] Thom Shanker and Eric Schmitt, "Threats and Responses: The Defense Secretary; Rumsfeld Seeks Consensus through Jousting," *The New York Times* June 15, 2003, http://query.nytimes.com/gst/fullpage.html?res=9D0DEEDA1231F93AA25750C0A9659C8B63&sec=&spon=&pagewanted=1 (accessed May 15, 2008).

shore bases. As matters turned out, the aircraft of CVW-3 embarked on *Harry S Truman* and those of CVW-8 on *Theodore Roosevelt* could not participate in strike operations against Iraq for the first two days of the war because they lacked permission to transit the airspace of any of the countries between the carrier operating areas and their likely targets in Iraq."[68] Once Turkish airspace was made available to the coalition by D+3, however, numerous carrier-based strike sorties were finally flown over Turkey and, along with allied SOF teams on the ground, contributed to the early surrender of Iraqi army units fielded in the north.

Out of a total of 41,404 coalition sorties flown altogether during the major combat phase of Operation Iraqi Freedom, Navy and Marine Corps aircraft operating from carriers and large-deck amphibious ships flew nearly 14,000, 33.8 percent. Of those, 5,568 were fighter sorties, 13.4 percent, 2,058 were tanker sorties, 442 were E-2C sorties, and 357 were ISR sorties. Navy assets flew 25 percent of the theater-wide ISR sorties during the three-week period of major combat.[69] The six carrier battle groups that participated directly in OIF were the core of a larger U.S. naval presence in the war zone that included three amphibious ready groups and two amphibious task forces totaling nearly 180 U.S. and allied ships, 80,800 sailors, and another 15,500 Marines.[70]

---

[67] Lambeth, *Combat Pair, the Evolution of Air Force-Navy Integration in Strike Warfare*, 57.

[68] Ibid.

[69] Ibid.

[70] Lambeth, *American Carrier Air Power at the Dawn of a New Century*, 52-53-58.

During Operation Iraqi Freedom, two LHDs served as "Harrier carriers," each launching an air group of AV-8B attack aircraft against targets inside Iraq.[71] One of these LHDs was the USS *Bonhomme Richard* (LHD 6); it played two significant roles in Operation Iraqi Freedom. First, it offloaded more than 1,000 Marines and gear from the 3rd Battalion, 1st Marine Regiment into Kuwait. Then, it took up position just miles off the coast of Kuwait and became one of two Harrier carriers in the Arabian Gulf – launching AV-8B Harrier strike aircraft into Iraq. Pilots from Marine Attack Squadrons 211 and 311, embarked aboard the ship, expended more than 175,000 pounds of ordnance, providing close air support to the Marines on the ground and during predetermined strikes in Iraq. During OIF the *Bonhomme Richard* launched more than 800 sorties, including 547 combat launches.[72] The other "Harrier carrier" was the USS *Bataan* (LHD 5); from January to June 2003, the ship flew up to 26 AV-8B's off her deck, directly contributing to the destruction of hundreds of military targets within Iraq.[73]

The scope of the air war had five primary mission goals:

1. Air dominance – air superiority with SEAD, DEAD and DCA.

---

[71] U.S. Navy Fact File, *Amphibious Assault Ships - LHA/LHD/LHA(R)*, 1.

[72] U.S. Navy Fact File, "*Bonhomme Richard* Departs 5th Fleet, Begins Transit Home," U.S. Navy.mil, http://www.navy.mil/search/display.asp?story_id=7858 (accessed March 11, 2008).

[73] U.S. Navy, "History of USS *Bataan*," USS *Bataan* (LHD 5), http://www.bataan.navy.mil/site%20pages/History.aspx (accessed June 8, 2008).

2. Strategic attack – A-Day, distributed throughout the country, delivered air and missile attacks on March 21, @2100, concentrated on significant targets. A-Day's combined attacks surged to over 2500 total sorties.

3. The West fight – counter-Scud efforts, a presidential tasking.

4. The North fight – helping SOF teams engage Iraqi forces north of Baghdad.

5. The South fight – support for the CFLCC's V Corps and I MEF. The south fight ultimately came to dominate sortie allocation and it drove requirements for carriers in the Persian Gulf.[74]

Generating enough sorties to meet mission needs was never a problem. The six committed carriers and their embarked air wings could generate sorties faster than the CAOC could generate targets. The highlights of the carrier contribution are outlined by Lambeth, "the embarked air wings surged for 16-hour flying days for 23 days straight. Carrier air employment in Iraqi Freedom mainly featured two-cycle operations. FAC-A and reconnaissance sorties, however, were typically three- and four-cycle operations because of their longer duration. For the most part, the war featured larger strike packages and shorter-duration sorties for the Navy than did OEF, real-time targeting and precision strikes reached an unprecedented high in both numbers and intensity. More than 800 targets were attacked within the time-sensitive targeting process, with an average of 3.5 hours from target nomination to ordnance on target. More than 78

[74] Grant, *Decisive Combat Operations*, 149-150-173.

percent of the Navy's strike sorties received their assignments in flight. Navy FAC-As provided 24-hour-a-day on-station service over southern Iraq and 16-hour-a-day service in the north. Strike-fighter operations also featured unprecedented flexibility in the selective use of satellite-aided JDAMs or LGBs, depending on assessed targeting needs. Of the 5,300 bombs dropped by Navy strike aircraft, fewer than 230 were unguided. More than 75 percent of the precision weapons delivered by Navy strike aircraft were JDAMs. Carrier air operations over northern Iraq were similar to those that largely predominated in OEF, in that they entailed a continuous airborne presence with weapons, with friendly SOF units closely intermingled with the enemy and with ordnance bring-back a matter of course. Operations in the south, in contrast, entailed more classic carrier air wing strike missions in a target-rich environment and with a clearer separation of friendly and enemy forces on the ground."[75]

A. OIF ANALYSIS

The constraint to carrier strike operations at sea due to negation of Turkey's airspace posed an ironic turn of events for the two carriers based in the eastern Mediterranean. Despite the vast freedom of maneuver ships possess at sea, even they can experience obstacles associated with host nation negotiations.

In a July 2003 testimony on Iraq to the Senate Armed Services Committee, Defense Secretary Donald Rumsfeld

---

[75] Benjamin S. Lambeth, "Highlights of the Carrier Contribution" In *American Carrier Air Power at the Dawn of a New Century* (Santa Monica, CA: RAND Corporation, 2005), 53.

described the formula for the success of high intensity operations, “OIF demonstrated that overmatching power is more important than overwhelming force. In the past, under a doctrine of overwhelming force, force tended to be measured in terms of mass - the number of troops that were committed to a particular conflict. In the future, mass may no longer be the best measure of power in a conflict. When Baghdad fell, there were just over 100,000 American forces on the ground. Enemy forces were overwhelmed not with the typical advantage in mass, but by overmatching the enemy with advanced capabilities, and using those capabilities in innovative ways: speed, jointness, intelligence and precision were key enablers.”[76] OIF demonstrated the preferred way to fight a war, regardless of the skill of the opponent. The formula included almost complete information dominance through C4ISR, and complete air dominance, including loitering platforms equipped with precision guided munitions (PGMs), with both of these used in combination with swift-moving powerful land forces. This was a one-two-three punch that the Iraqis could not withstand.[77] OIF marked new tactical directions for carrier aviation, the application of air power followed two paths, one of which is support for the ground troops in the form of CAS with more precision disabling of mechanized forces and a higher degree of precision against interdiction points. The other aspect

---

[76] Senate Armed Services Committee, *Testimony on Iraq,* Wednesday, July 9 sess., 2003, 1, http://www.defenselink.mil/speeches/speech.aspx?speechid=488 (accessed 15 May 2008).

[77] Walter J. Boyne, "Lessons Learned and the Fight to Win the Peace" In *Operation Iraqi Freedom: What Went Right, what Went Wrong, and Why* (175 Fifth Avenue, New York, NY 10010: Tom Doherty Associates, LLC, 2003), 161-183.

was trying to get down to the smallest number of targets possible to have the strategic effect.[78]

Keeping on balance, the first lesson each of the services sought to impress upon themselves was that the "triumph" in Iraq should not go to their heads and that future wars would almost undoubtedly be more difficult and costly; consider the continuing effort today in both OEF & OIF. The conflict with Iraq engaged an enemy who had virtually no military capabilities left after an air war of attrition lasting over twelve years. Consequently, the conventional phase of the conflict was lopsided and brief. Carrier and amphib aviation flew nearly one-third of all coalition sorties, of which 13.4 percent were fighter sorties, against an enemy that "just melted away."[79] The aftermath, however, is proving far more difficult, and in this phase of the conflict the capability to bear massive air power is less relevant. The ability of strike aircraft to hit a number of targets with precision does represent a significant step forward in technological capabilities; and once air supremacy is achieved, these capabilities allow the projection of almost unlimited firepower against specific targets of value to the enemy. Nevertheless, an observation by the authors of *The Iraq War: A Military History* makes an important point; "unless advances in air power are coupled with intelligent thinking - by planners on the ground - about the nature of one's opponent and of wars and their aftermath, these improved technologies will ensure only that

---

[78] Grant, *Decisive Combat Operations*, 149-150-173.

[79] John Keegan, *The Iraq War*, 1st American ed. ed., Vol. 184 Knopf, Alfred J, 2004), 272.

political and military defeats will come later, and at greater costs."[80] The demand for the sortie generating capacity and firepower of a super carrier has diminished following the initial high-intensity invasion of Iraq. Conventional U.S. forces may be overwhelmingly superior to the insurgents we now see in Iraq with regard to traditional combat, but an Iraqi landscape highlighted by suicide and roadside bombs, assassinations, and beheadings is far from traditional combat, and thus, making the presence of a CVN and its strike group less relevant in that it masses too much firepower for the low intensity phase of the conflict.

Operations in Iraq focus on land forces and tend to demand large numbers of dismounted troops. However, air forces do make important contributions, especially in reconnaissance and strike. Reconnaissance with unmanned aerial vehicles (UAVs) greatly improves commanders' views of their areas of operations. Strike, generally conducted as close air support, occurs less frequently in COIN than in conventional combat but still plays an important role, for example, in reducing insurgent strongholds.[81]

All of the services employ UAVs for reconnaissance in Iraq. The most useful and heavily tasked is the Air Force Predator, a turbocharged aircraft equipped with synthetic-aperture radar and electro-optical and infrared sensors that is flown remotely and can stay airborne for 24 hours. In

---

[80] Murray Williamson and Robert H. Scales Jr., "The Air War" In *The Iraq War: A Military History* (United States of America: President and Fellows of Harvard College, Harvard University Press, 2003), 154-155-183.

[81] Bruce R. Pirnie and Edward O'Connell, "Counterinsurgency in Iraq" In *Counterinsurgency in Iraq (2003-2006)*, Vol. 2 (Santa Monica, CA 90407-2838: RAND Corporation, 2008), 35-36-44.

addition to flying reconnaissance, Predators attack with laser-guided Hellfire missiles fitted with shaped-charge, blast-fragmentation, or augmented-charged warheads.[82] The U.S. Army's principal UAV is the RQ-5A Hunter, a twin-boomed aircraft equipped with electro-optical and infrared sensors that is able to stay airborne for 18 hours.[83] UAVs provide persistent surveillance of areas of interest, such as suspected terrorist safe houses, urban centers, lines of communication, and terrain surrounding major cities. When not armed, they provide data to other systems for rapid engagement of targets. Prior to the invasion, the U.S. Air Force fielded a prototype of the remote-operations video-enhanced receiver (ROVER),[84] a man-portable laptop computer that receives streaming data from airborne sensors. Equipped with ROVER, a joint tactical air controller can see pictures gained by sensors mounted on UAVs, fighters, and bombers. ROVER IV includes a point-and-click feature that allows the operator to designate a target on the display and send that designation to the attack aircraft. This is especially useful when the air controller and other observers do not have line-of-sight to the target and therefore cannot determine its location by lasing. Moreover, it eliminates

---

[82] U.S. Air Force, "MQ-1 Predator Factsheet," Air Force Link, http://www.af.mil/factsheets/factsheet.asp?fsID=122 (accessed May 10, 2008).

[83] Jane's Information Group, "Northrop Grumman/IAI MQ-5 and RQ-5 Hunter," Jane's, http://www8.janes.com/JDIC/JDET/documentView.do?docId=/content1/janesdata/binder/juav/juav1298.htm@current&pageSelected=&keyword=Hunter_UAV&backPath=http://jdet.janes.com/JDIC/JDET&Prod_Name=JUAV&activeNav=http://www8.janes.com/JDIC/JDET (accessed May 5, 2008).

[84] Julie Weckerlein, "ROVER Gives Joint Force New Vision," Air Force Link, http://www.af.mil/news/story.asp?id=123013585 (accessed May 5, 2008).

the need for talk-on, i.e., verbal description of the target, which can be time-consuming.[85]

LHD class ships or light to medium carriers should be seriously considered for low intensity conflict such as the one's currently underway in OEF and OIF as a viable alternative to super carriers. Augmented by UAVs and net-centrically connected, these platforms provide a more appropriate measure of firepower and capability to the equation. With the acquisition of aircraft such as the STOVL F-35B and its complement of modern precision munitions, it could be an effective strike platform comparable to that provided by CVN's. OIF demonstrates the American capability to mass firepower in a joint and combined arena in a very capable manner, but must be, as Walter Boyne described in *Operation Iraqi Freedom: What Went Right, What Went Wrong, and Why*, "tempered against the notion that future enemies may not be as inept as the Iraqi Army or have totally counterproductive leadership."[86]

U.S. sea-based airpower in the form of super carriers played a relevant role and has evolved into a very capable net-centric combat force during the high-intensity phase of the campaign. When comparing land-based Air Force assets vs. carrier based air power and the matter of integrated strike-warfare operations, Lambeth's *Air Force-Navy Integration in Strike Warfare, A Role Model for Seamless Joint-Service Operations* Naval War College Review article describes the integration as; "the two services are, and should duly regard one another as, natural allies in the roles and

---

[85] Pirnie and O'Connell, *Counterinsurgency in Iraq*, 35-36-44.

[86] Boyne, *Lessons Learned and the Fight to Win the Peace*, 161-183.

resources arena. They did not compete with each other in OEF or OIF but rather supported one another in the successful pursuit of joint campaign objectives. When viewed from an operational rather than a bureaucratic perspective, the Air Force's and Navy's long-standing involvement in air-delivered conventional force projection are complementary rather than competitive in the service of joint force commanders; land-based bombers and fighters and carrier-based fighters are not duplicative and redundant but rather offer overlapping and mutually reinforcing as well as unique capabilities for conducting joint strike warfare. For example, Air Force long-range bombers can penetrate deeper into the littoral reaches than can carrier-based strike fighters supported solely by organic tanking. They also can launch directly from their home bases in the U.S., if no carrier strike group is positioned within immediate reach of a designated target area. Unlike bombers, however, carrier air power can provide a sustained presence as long as may be required over a target area once it is in place and provided with the requisite nonorganic tanker support. The greatest liability of aircraft carriers for immediate crisis response is that they may not be close enough on short notice to where they are most needed. In contrast, the greatest advantage of long-range bombers is that they can be over a target set anywhere in the world within twenty hours of takeoff. The downside for bombers, however, is that they cannot loiter for long or regenerate striking power once their munitions have been expended, whereas carriers – especially with more than one on station – can offer persistence once they are in place.

Therein lies the synergy offered by Air Force bombers, land-based fighters and Navy carrier air wings when employed in an integrated fashion."[87]

In summary, the overall contribution of strike sorties provided to OIF by U.S. sea-based aircraft measured at thirteen-and-a-half percent, and although carriers surged as required to meet operational tempo, they never reached maximum sortie generation capability. There are two points concerning this worth citing; first, the number of sea-based strike sorties measured at a small amount of the total effort, which explains the logic to procure a new class of aircraft carrier in CVN-21, which is designed to increase sortie rates by about 25 percent.[88] On the other hand, the current Nimitz class CVN has a concentration of untapped firepower for the preponderance of on-station time in theater. Because of this, it's feasible to envision an alternative in the way U.S. sea-based air power is employed, e.g., a more distributed number of sea-based air platforms, that can be tailored for high and low intensity scenarios. It makes sense to invest in smaller conventional carriers that provide distribution of firepower and flexibility of mission, instead for solely procuring large-deck carriers. The synergy between Air Force and Navy strike aircraft described above can be enabled by smaller carriers and amphibious ships as well.

---

[87] Benjamin S. Lambeth, "Air Force-Navy Integration in Strike Warfare, A Role Model for Seamless Joint-Service Operations," *Naval War College Review*, no. Winter (2008), 42-43.

[88] U.S. Navy Fact File, "Aircraft Carriers - CVN 21 Program," Navy.mil, http://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=250&ct=4 (accessed May 5, 2008).

THIS PAGE INTENTIONALLY LEFT BLANK

IV. FALKLANDS WAR

On 2 April 1982, Argentina invaded the Falkland Islands, a remote British colony in the South Atlantic. The move led to a brief, but bitter war. Over the next 10 weeks, the Falkland's 1,800 inhabitants found themselves the focus of the world's attention. The isolated British dependency had been overrun by an Argentine naval task force. The token garrison of 80 Royal Marines were taken prisoner, after they inflicted a handful of casualties. Within a few hours 150 years of British government had ended. For the Argentines the British possession of the islands - which they called the Malvinas - was a long standing affront to national pride. They traced their claim back to the days of the Spanish empire, of which both the Falklands and Argentina had been a part.

The decision to use force instead of diplomacy was taken by Argentina's military junta. It hoped to use the nationalist fervor a short successful war would arouse to divert attention from the country's shattered economy. However, winning the Falklands was hardly a glittering prize. Set in the wild seas of the South Atlantic, Britain's largest remaining colony was about 350 miles from Argentina, its barren ground supported more sheep and penguins than people. To the surprise of the Argentines the British Government immediately decided it was prepared to fight to reclaim the islands. The British Prime Minister dismissed advice from defense officials who feared the islands could

not be re-taken. The British PM ordered a task force to be assembled to fight a war 8,000 miles away from the British Isles.[89]

In the days before the invasion British intelligence became aware that a military crisis was fast approaching.[90] Contrary to Argentine expectations, the British government reacted strongly to the building crisis by ordering the sailing of three SSN's (HMS *Conqueror, Spartan, and Splendid*), even before the invasion on 2 April, as signs of pending Argentine military action appeared.[91] Preparations to send a task force to repossess the Falklands began three days before they were invaded.[92] British planners appreciated from the very beginning - from before the task force was assembled - that to achieve the aims of the government might well require the landing of a substantial land force on the Falklands. This would be a difficult and hazardous task the success of which would depend critically on the control of the sea and airspace at the time of the amphibious force's approach, landing, and consolidation.[93] Airpower would be the key, for ships alone could not provide

---

89 BBC News, "Fight for the Falklands, Twenty Years on," BBC News.co.uk, http://news.bbc.co.uk/hi/english/static/in_depth/uk/2002/falklands/guide.stm (accessed March 6, 2008).

90 Ibid.

91 John F. O'Connell, "Malvinas/Falklands War (Argentina-Great Britain) 1982" In *The Effectiveness of Airpower in the 20th Century, Part Three (1945-2000)*, Vol. Part Three (1945-2000) (USA: iUniverse, 2006), 102-124.

92 BBC News, *Fight for the Falklands, Twenty Years on*, 7.

93 Ray G. Funnell, "It was a Bit of a Close Call: Some Thoughts on the South Atlantic War" In *The War in the Air 1914-1994*, ed. Alan Stephens, American Edition ed. (Maxwell Air Force Base, Alabama: Air University Press, 2001), 221-256.

the control required. Surface ships and submarines could defend against a surface or submarine threat, but they could not reduce sufficiently the vulnerability of the amphibious force to air attack. This vulnerability would be particularly stark at the time of the landings. To achieve control of the air would require air power, and this could only be effectively achieved organically. The British aircraft carriers and the Sea Harriers were, therefore, the sine qua non for the success of the amphibious operation. Once ashore and consolidated, the land force would need to be supported and sustained. Here again air power would be crucial, and planning had to ensure it was available to the land force in the quantity and of the quality required.[94]

Once it broke, the news of the invasion exploded like a political bombshell. The Foreign Secretary and two junior ministers had resigned by the end of the week; they took the blame for Britain's poor preparations and plans to decommission HMS *Endurance*, the navy's only Antarctic patrol vessel. It was a move which may have led the junta to believe the UK had little interest in keeping the Falklands.[95] There was also every indication that the UK would probably have no operational aircraft carriers, the HMS *Hermes* and *Invincible* both victims of defense cuts due to a belief that carriers were no longer required in defense. As far as the junta leader Galtieri and Anaya were concerned the situation was simple: no British carriers

---

[94] Ray G. Funnell, "It was a Bit of a Close Call: Some Thoughts on the South Atlantic War" In *The War in the Air 1914-1994*, ed. Alan Stephens, American Edition ed. (Maxwell Air Force Base, Alabama: Air University Press, 2001), 221-256.

[95] BBC News, *Fight for the Falklands, Twenty Years on*, 7.

meant no air cover, no air cover meant no British surface ships, no surface ships meant no British landing force, no landing force meant "*no contest*." The Argentine reasoning was sound, but their timing wrong.[96]

Several serious political-military miscalculations by the Argentine junta were involved. The first was the start of the war in 1982 instead of waiting a year. Great Britain had planned to decommission its aircraft carriers later in the year. If that had occurred, there would have been no possible way for Great Britain to project effective air power into the South Atlantic region.[97] By 5 April the first battle ships, including two aircraft carriers (HMS *Invincible* and *Hermes*), hurriedly set sail for the South Atlantic. In all, Britain sent over 100 ships and 27,000 personnel to take part in the war. By then Britain's cause had already won the backing of the UN. The Security Council voted 10-1 backing a resolution that demanded the immediate withdrawal of Argentinean forces from the Falklands.[98]

Due to the nature of the theater - a small group of islands surrounded by isolated ocean - the air component was vital to both sides during the war. At the outset of the war, the forces dedicated to the fight by each side, though not identical, were virtually balanced in strength. The British advantage in carriers and submarines was offset by the substantial numerical edge of the Argentines in fixed wing attack aircraft. In terms of ground forces, the

---

[96] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

[97] O'Connell, *Malvinas/Falklands War (Argentina-Great Britain) 1982*, 102-124.

[98] BBC News, *Fight for the Falklands, Twenty Years on*, 7.

Argentine army in the Falklands was one and one quarter times the size of the British expeditionary force.[99] In purely numerical terms, the Argentines held a considerable advantage in numbers of fixed wing aircraft available for employment. The total number of Argentine fixed wing aircraft employed was 216 against a British total of just 55. This was a ratio of almost four to one.[100]

On 21 April, British helicopters from the frigate *Antrim* and the fleet auxiliary *Tidespring* landed reconnaissance teams on a glacier on South Georgia Island. Alerted of the British naval activity, Argentina had the submarine *Santa Fe* (the former USS *Catfish*) discharge supplies and 20 marines at the island's port village of Grytviken on the 24th. The next day, a British Wessex helicopter caught the Argentine submarine departing on the surface. Two depth charges and subsequent air attacks crippled the *Santa Fe*, forcing it back into port, where it later sank. Later that same day, British warships peppered the defending garrison with gunfire, enabling a small Royal Marine assault force to land by helicopter to storm and eventually capture the Argentine positions.[101]

In the early morning darkness of 1 May, 1,000-pound bombs dropped by a lone British Vulcan B.2 strategic bomber cratered the Port Stanley airstrip on East Falkland Island.

---

[99] John Arquilla and Maria M. Rasmussen, "The Origins of the South Atlantic War," *Journal of Latin American Studies* 33, no. 4 (2001, 2001), 739-775, http://links.jstor.org (accessed 11 March 2008).

[100] Ibid.

[101] David F. Winkler, "A Long Look Back to the Present Day," *Sea Power* 45, no. 3 (Mar, 2002), 55, http://proquest.umi.com/pqdweb?did=110643804&Fmt=7&clientId=65345&RQT=309&VName=PQD.

Later that morning, Sea Harriers from *Hermes* put additional ordnance on the airstrip, and on another airfield at Goose Green. Royal Navy warships contributed to the damage by carrying out shore bombardment against Argentine positions. Reacting, the Argentine Air Force launched 56 sorties against the British. The destroyer *Glamorgan* and frigates *Alacrity* and *Arrow* absorbed damage from near misses and strafing. British Sea Harriers on combat air patrol splashed four of the Argentine aircraft. With British intentions evident, The Argentine's planned to defend the "liberated" Malvinas by attacking with sea and air forces from several directions. Approaching undetected from the northwest early on the 2nd of May, the Argentine aircraft carrier *Vienticinco de Mayo* readied to launch what would have been the world's first carrier vs. carrier attack since WW II. However, the lack of wind thwarted the launch of its aircraft, forcing Argentina's lone carrier to withdraw.[102]

In one of the more significant events of the conflict, airpower played no part. On May 2, the British SSN (attack submarine, nuclear) HMS *Conqueror* sank the Argentine cruiser *General Belgrano*. Airpower was, however, affected by that event. The warships of the Argentine navy, including its only carrier, *Vienticinco de mayo,* were immediately withdrawn to the mainland and never again ventured beyond the 12-mile limit imposed by the British. The aircraft and

---

[102] David F. Winkler, "A Long Look Back to the Present Day," *Sea Power* 45, no. 3 (March 2002), 55, http://proquest.umi.com/pqdweb?did=110643804&Fmt=7&clientId=65345&RQT=309&VName=PQD.

crews of the naval air arm were the only elements of the Argentine navy to play a part in further combat.[103]

A second defining event of the war came just two days later. In the early afternoon of May 4, in conditions of low cloud and poor visibility 85 nautical miles south of Port Stanley, the Type 42 British destroyer, HMS *Sheffield,* was struck by a single AM-39 Exocet antiship missile fired from a range of 25 miles by one of a pair of Argentine Super Etendard aircraft operating from Rio Grande air base on the Argentine mainland. Although the warhead did not explode, the fire created within the ship spread very swiftly and could not be controlled. The ship was abandoned five hours later with a loss of 21 of its 268-man crew, twenty four others were injured. While the destroyer burned, *Hermes* launched three Sea Harriers against a landing strip at Goose Green where some Argentine aircraft were parked. On the first pass, a Sea Harrier was brought down by anti-aircraft fire, and its pilot killed.[104] This showed that it was not to be a one-sided conflict. The vulnerability of the British task force to modern weapons systems had been dramatically exposed.[105] Stunned by these losses, the battle group moved farther offshore and contemplated the day's result. The precious Sea Harriers, it was decided, would concentrate on

---

[103] Scot Macdonald, "The Falklands Campaign: The British Reconquest and the Argentine Defense," *Marine Corps Gazette* 84, no. 3 (March 2000), 72, http://proquest.umi.com/pqdweb?did=51139028&Fmt=7&clientId=65345&RQT=309&VName=PQD.

[104] Carl Posey, "Air War in the Falklands," *Air & Space Smithsonian* 17, no. 3 (Aug/Sep, 2002), 70, http://proquest.umi.com/pqdweb?did=141539931&Fmt=7&clientId=65345&RQT=309&VName=PQD.

[105] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

achieving air supremacy. The RAF GR.3 Harriers, fitted with a ground attack computer and navigation system, would take up the high-risk attack role when they arrived in theater. The Sea Harrier, developed from the GR.3, was important to naval activities. Twenty Sea Harriers were operated from the carriers HMS *Hermes* and *Invincible* mainly for fleet air defense. Although they destroyed 21 Argentine aircraft in air combat - in part due to using the American-supplied latest variant (AIM-9L) Sidewinder missile and the Argentine aircraft operating at extreme range - they couldn't establish complete air superiority and prevent Argentine attacks during day or night nor stop the daily flights of Argentine C-130 Hercules transports to the islands. Harrier GR.3s were operated by the RAF from *Hermes* and provided close air support to the ground forces and attacked Argentine positions. Had most of the Sea Harriers been lost, the GR.3s would have replaced them in air patrol duties. Four Harrier GR.3s were lost to ground fire, accidents, or mechanical failure.[106]

The next two weeks saw British attempts at a blockade and Argentine attempts to resupply its Falkland garrison - these were short engagements that took a bloody toll on both sides. The British captured the Argentinean spy ship *Narwal* and sank the cargo vessel *Isla de Los Estados*. More Argentinean aircraft fell to Royal Navy SAMs. A raiding party flown in by helicopter from *Hermes* destroyed an ammunition dump on Pebble Island and 11 additional aircraft. An Argentine A-4 holed the frigate *Glasgow* with a 1,000-

---

[106] Gordon Smith, "Battle Atlas of the Falklands War 1982 - by Land, Sea and Air," Naval-History.net, http://www.naval-history.net/NAVAL1982FALKLANDS.htm (accessed May 15, 2008).

pound bomb, which, fortunately for the British, failed to detonate.[107] From 4 to 20 May, the conflict went into an air war lull. The British were waiting for the rest of the land force to join the task force. The Argentines were reviewing what had occurred, regrouping their forces, and planning a maximum air effort in opposition to the British landings. Argentine planners developed a 75-sortie effort to launch against the British as they landed, reasoning that maximum confusion in the British defenses would be created if they were flooded with aircraft.[108]

Late on 20 May, using deception and the cover of darkness, Britain began to send in Special Forces and marines to secure positions around Port Carlos on the northwest corner of East Falkland Island. On the day of the British amphibious landings, 21 May, an estimated 60 sorties reached the Malvinas in pursuit of the tactical aim, but the confusion that was planned was only partially realized. No Argentine aircraft appeared until the morning was well advanced and then, having had to work their way through the outer defenses and having little tactical freedom due to lack of fuel endurance, they appeared a few at a time at widely separated intervals of time, the aircraft took advantage of the surrounding mountainous terrain to swarm in against the British combatants supporting the operation and failed to disrupt the movement of troops ashore. Ten Argentine aircraft were lost, nine to Sea Harrier defenses and one to a SAM. British forces lost HMS *Ardent*, and HMS

---

[107] Winkler, *A Long Look Back to the Present Day*, 55.

[108] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

Argonaut was seriously damaged with three other ships damaged to a lesser extent.[109]

The next day bad weather on the mainland grounded Argentine aircraft and gave the Royal Navy a respite, allowing more materials and troops to be landed. The Argentine air attacks resumed on 23 May. The next two days saw intense air activity resulting in British losses of HMS *Antelope* and HMS *Coventry* and substantial damage to HMS *Sir Galahad.* The most significant British loss of the period was not, however, a naval vessel but a merchant vessel supporting the operations. On 25 May, by flying at very low level and using deceptive routing, two Super Etendards equipped with Exocet AM-39 antiship missiles closed on the British task force undetected. MV *Atlantic Conveyor,* undefended, was hit and caught fire. Twelve lives were lost. Fortunately for the British, all the Harriers and Sea Harriers the ship had brought south plus some helicopters had already been flown off. Still, the British lost a considerable amount of logistics materials and an important asset critical to the success of the campaign.

The last day of intensive Argentine air attacks, 27 May, in San Carlos Water, saw the most successful Argentine strike against a land target in the war. Argentine A-4s hit the British main logistics area and medical dressing station at Ajax Bay. Guns, mortars, and ammunition being loaded into helicopter nets were destroyed, as were all of 45 Commando Battalion’s antitank missiles and launchers. Several men

---

109 Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

were killed and wounded. The dressing station was rendered unusable for the rest of the war.[110]

Late in the war, British amphibious landings were to be conducted at Fitzroy-Bluff Cove in East Falkland. The plan was to move 1,200 troops of the Scots and Welsh Guards to the east coast rather than having them arrive by foot. The plan was considered hazardous, but doing so would save time and effort. British amphibious commanders did not like the plan, but considered that they would probably get away with it as long as they were swift, spent as little time as possible in unloading the LSL (landing ship, logistic) and the weather stayed favorable. In the event, none of these applied. On 8 June, the landing was detected by the Argentines who moved swiftly to mount an air attack utilizing Daggers and A-4s. The A-4s found *Sir Galahad* and *Sir Tristram* unloading in Pleasant Bay. *Sir Tristram* had disembarked many of its troops but, unfortunately, *Sir Galahad* had not. Both ships were bombed and strafed, suffering serious damage and loss of life. The most damage and carnage resulted from the detonation of a bomb deep within *Sir Galahad.* In total, 50 men were killed and another 57 wounded.

The Argentine Daggers did not reach Pleasant Bay. En route they came upon HMS *Plymouth* Leaving San Carlos Water alone and without air cover. They attacked and badly damaged the ship before returning safely home. In fact, all of the Daggers and A-4s involved in these missions recovered safely. Such was not the case for the follow-up missions now

---

[110] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

mounted by the Argentines. The defenses had been alerted and harriers were deployed on combat air patrol (CAP) overhead. The result was no further damage inflicted on the ships and three Argentine A-4s lost.[111] Enough ground forces were ashore to sustain the campaign, and British forces were soon entrenched on the outskirts of Port Stanley.[112]

At 9:00 P.M. local time on 14 June 1982, the Argentine commanders and governor of the Malvinas, Brigadier general Menendez, surrendered all Argentine forces on the islands to the commander land forces Falkland Islands, Major General Moore. At the loss of 1,002 lives (256 British, 746 Argentine) and more than 2,000 wounded, British administration of and sovereignty over the Falkland Islands had been restored.[113]

A. FALKLANDS WAR ANALYSIS

Air power was a significant factor in the war; British forces depended on sea-based air power to attempt to gain air superiority. They eventually achieved that goal, although tenuously at best. Without the Royal Navy's aircraft carriers, Great Britain would have been unable to contest the Argentine action. As it was, Argentine air strikes continued to deliver heavy blows until nearly the final week of the conflict. The lack of a sea-based airborne early warning capability was a serious deficiency for the Brits. British land-based air power provided vital aerial

---

111 Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

112 Winkler, *A Long Look Back to the Present Day*, 55.

113 Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

reconnaissance information to allow the movement of naval forces into position near South Georgia Island and the Falklands. The Falklands had only three airfields. The longest and only paved runway was at the capital, Stanley, and even it was too short to support fast jets. Early in the campaign, the successful Vulcan B.2 bombing of the airfield at Port Stanley had greater strategic than tactical results. It led the Argentine Air Force to withdraw its best all-weather fighters to protect its mainland airbases against similar attacks, although the bombing did not prevent continued use of the airfield for re-supply.[114] Launching major strikes from the mainland severely hampered Argentine efforts at forward staging and conducting combat air patrols & close air support over the islands. The effective loiter time and tactical freedom of incoming Argentine aircraft was low, especially when they were later compelled to negotiate British outer defenses in any attempt to attack the islands.[115] In basic terms, the air war in the South Atlantic was one in which land-based air forces attempted to prevent a naval task force from firstly putting a land force ashore and then supporting it. One can only wonder how the outcome might have been different had the Argentines decided to conduct fighter jet operations from Port Stanley airfield. In the opinion of Ray Funnell, the author of *It Was a Bit of a Close Call*, "the key to success is the airfield at Stanley…with Argentine fast jets operating from Stanley, the operational calculus is transformed. Who now is

---

[114] O'Connell, *Malvinas/Falklands War (Argentina-Great Britain) 1982*, 102-124.

[115] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

forced to operate at the limit of range in conducting offensive operations? Had the Argentines achieved the capability of flying their fighters from Stanley, the course of the war would probably have been quite different."[116]

This was the first major conflict involving the sustained use of such weapon systems as vertical short take-off and landing (VSTOL) aircraft, and antiship missiles.[117] This campaign proves that smaller sea-based air platforms in the form of light to medium conventional carriers can be a viable combat force if used astutely in conjunction with a jointly netted force. Control of the air was seen by both sides as one of the keys to success. The British started with fewer assets, but their thinking on how to use them to obtain control of the air was superior: the Argentines began with most of the advantages and failed to capitalize on that fortunate circumstance.[118] Royal Navy Sea Harriers proved to be effective air defense fighters, particularly when armed with an all-aspect heat-seeking (AIM-9L) air-to-air missile, and facing enemy aircraft that were older and could not tarry to fight. RAF GR-3 Harriers proved their worth at Goose Green when they facilitated the victory by taking out a nest of Argentine 35mm AAA (anti-aircraft artillery) guns that were holding up the attack.[119] Argentine air attacks pointed out the need for all units, ashore or afloat, to have adequate SAM (surface to air missiles)/AAA (Anti-

---

[116] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 247.

[117] Ibid.

[118] Ibid.

[119] O'Connell, *Malvinas/Falklands War (Argentina-Great Britain) 1982*, 102-124.

aircraft artillery) defenses. Afloat, the effective use of cruise missiles by the Argentines demonstrated the need for chaff launchers and missile decoys, and low-altitude capable SAMs or CIWS (close-in weapons system) aboard all ships.

The Sea Harriers were stretched to their range limits. Because they could land vertically, Harriers didn't need much fuel in reserve. As the campaign went on, Harrier pilots began adapting to, and recovering with, getting shorter and shorter on fuel reserves for recovery to the aircraft carriers, the Harrier pilots knew they were going to land on first attempt. Landing allowance was about 400 pounds. By comparison, the figure for an F-14 at the time was about 5000 pounds, depending on distance to alternate landing field, or, blue water ops. And they flew in every kind of weather, day or night. If they could see the wake and see the deck when returning to the ship, they could land very safely. One Harrier was guided home by flares tossed behind the ship.[120]

The Argentine Air Force and Navy air arms were effective, considering the handicaps they faced. They both practiced low altitude tactics in the interval between the occupation of the Falklands and the arrival of the British Task Force. The failure of a number of their bombs to detonate saved several British ships. However, that is a result that unfortunately can be expected when new tactics are rapidly put into action. The Argentine naval pilots were much more experienced in attacking ships. The Argentine Air Force used reconnaissance aircraft and ground observers to good advantage in locating targets, and monitoring the

[120] Posey, *Air War in the Falklands*, 70.

British CAP (combat air patrol) situation in the target area. The Argentine Navy air arm similarly used its Neptune aircraft (the Lockheed P-2 Neptune was a naval patrol bomber and anti-submarine warfare aircraft) to provide target location for its Super Entendard-Exocet missile strikes. The lack of more aerial tankers, and high performance fighters equipped for aerial tanking capability, meant that the Argentine Air Force could not contest the Sea Harriers for air superiority. Argentine Air Force transport aircraft performed very well under difficult conditions. The role of helicopters was a very major one, both in ASW (anti-submarine warfare), insertion and extraction of ground reconnaissance units, and in movement of troops, equipment and supplies.[121] More than 80 percent of all sorties flown by the British were those of their helicopters and, of those, more than 80 percent were moving people and stores. The Royal Navy helicopters flew 10,381 sorties for a total of 21,049 flying hours.[122]

Both sides understood the importance of control of the air, and did their best to effectively use what they had to achieve that end. A greater effort by the two Argentine air arms to place detachments of their aircraft at the Port of Stanley airfield, well protected by air defense radar, SAM’s and AAA, might have made a difference in the outcome. It certainly could have delayed the attempted landing.[123]

---

[121] O'Connell, *Malvinas/Falklands War (Argentina-Great Britain) 1982*, 102-124.

[122] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

[123] O'Connell, *Malvinas/Falklands War (Argentina-Great Britain) 1982*, 102-124.

The most capable air weapon system the Argentines possessed, the Super Entendard-Exocet combination, was in too short supply to wage a successful attrition battle. The Argentine Navy did well to achieve the two hits with the antiship missile. That weapon was a generation beyond anything they had previously possessed, and it would be a difficult task for any air arm to become combat proficient with a new weapon system in a few months.[124]

There are certainly indications of inadequate coordination between the Argentine Air Force and the Argentine Navy in scheduling air strikes. The intermittent timing of the air strikes provided the Sea Harriers time to return to their carriers, refuel, rearm and take CAP station again between attacks. A greater concentration in time might have overwhelmed the British air defense system. The same criticism can be leveled at the Argentine Air Force in coordinating its own strikes. This highlights a lack of adequate situational awareness on the part of the Argentine command. The British command was better off, but just barely.[125]

At the breakout of the Falklands War, British carrier aviation was virtually defunct with their carriers headed to decommissioning. In 1981 the Conservative government's Defense Secretary John Nott produced a white paper proposing major cuts for the navy in the next ten years.[126] The

---

[124] O'Connell, *Malvinas/Falklands War (Argentina-Great Britain) 1982*, 102-124.

[125] Ibid.

[126] Max Hastings and Simon Jenkins, "Task Force" In *The Battle for the Falklands*, First American Edition 1983 ed. (New York, NY 10110: W.W. Norton and Company, Inc., 1983), 72-73-97.

Falklands War revitalized their belief in the need to maintain a sea-based air power capability. The proposed cutback in the surface fleet was abandoned and replacements for many of the lost ships and helicopters plus more Sea Harriers were ordered.[127] Today the British demonstrate its commitment to carrier aviation and are set to procure two large deck multi-purpose Queen Elizabeth class aircraft carriers. They will displace 75,000 tons at full load and carry 40 F-35B STOVL, and later F-35C CTOL if they choose. Defense secretary Des Browne confirmed the £3.8bn order for the two carriers on 25 July 2007. The carriers will take the form of large, conventional carriers, which will be adapted for STOVL operations. The carriers, expected to remain in service for 50 years, will be convertible to catapult assisted take-off but arrested recovery (CATOBAR) operations for the generation of aircraft after the F-35. The Royal Navy and RAF will operate the STOVL F-35B variant.

Medium conventional aircraft carriers represent a feasible alternative to the 100,000 ton displacement nuclear platform for low to medium intensity campaigns against adversaries deemed not a peer competitor, which may constitute a majority of U.S. asymmetric conflicts today. HMS *Invincible* and *Hermes* were light aircraft carriers in the 22,000 ton displacement range. Today's U.S. LHD air capable amphibious assault ships are in the 40,000-45,000 ton displacement class and can carry from 12-20 AV-8B STOVL

---

127 Max Hastings and Simon Jenkins, "Task Force" In *The Battle for the Falklands*, First American Edition 1983 ed. (New York, NY 10110: W.W. Norton and Company, Inc., 1983), 72-73-97.

Harriers.[128] In the future, U.S. LHD's equipped with 5th generation[129] aircraft such as the F-35 Lightning II, which can employ highly efficient smart weapons, can account for the many low to medium intensity asymmetric conflicts that may present themselves in our near future and that appear to be the norm.

The sinking of the *General Belgrano* was a defining event in this conflict. It established that the Royal Navy through its SSNs commanded the seas;[130] it established a relevant point about what kind of force is best suited to achieving sea control, a prerequisite to sea-based offensive air operations. The submarine posed a formidable threat to the Argentine combat force; it was one which they were not appropriately equipped to negotiate, tipping the scales in favor of the British.

Current U.S. Navy outlook towards combat at sea envisions precision firepower netted with shared information dominance. Described as FORCENet and Sea Strike by the Naval Aviation Enterprise in Naval Aviation Vision 2020, its tenets are:

> FORCENet ties the pillars of Sea Strike, Sea Shield, and Sea Basing together. It is the persistent integration of warriors, sensors, networks, platforms, and weapons into a networked, distributed combat force across the

---

[128] Jane's Information Group, *Wasp Class: Amphibious Assault Ships (LHDM)*, 1.

[129] Some of the attributes of a fifth generation fighter are; advanced stealth, net-enabled sensor & information fusion with instrumentation for unsurpassed pilot situational awareness, supersonic speed, extreme fighter agility, new standards of reliability and maintainability, lethal, survivable, sustainable and deployable.

[130] Funnell, *It was a Bit of a Close Call: Some Thoughts on the South Atlantic War*, 221-256.

spectrum of conflict from seabed to space and sea to land. It implements the Global Information Grid (GIG) and is the Navy's portal to GIG Enterprise Services (GIG-ES) – a grid of value-added information, web, and computing capabilities that improve user access to mission critical data, enhancing the pervasive awareness of the battlespace. It will transform the way we receive information, enabling decision-makers to react quickly and decisively with superb situational awareness. FORCENet will harness information required for knowledge-based combat operations and increased survivability, and will also provide real-time enhanced collaborative planning amongst joint and coalition partners. It will speed the distribution of smart-weapon sensor information, which will improve Battle Damage Assessment (BDA) and facilitate re-strike decisions. It will vastly improve our capabilities in Electronic Warfare (EW), littoral Anti-Submarine Warfare (ASW), and Information Operations (IO), and will enable Naval Aviation combat forces to achieve battlespace dominance in concert with other Naval and Joint forces across the full range of military operations.[131]

Sea Strike is the projection of precise, persistent, and responsive offensive firepower. It is how the 21st century Navy and Marine Corps will exert direct, decisive, and sustained influence in Joint campaigns. The Carrier Strike Group (CSG) and its embarked Carrier Air Wing (CVW), and the Expeditionary Strike Group (ESG) and its Marine Expeditionary Unit's Aviation Combat Element (ACE), are ideally suited for this type of effects-based warfare, generating the right effect on the right target at the right time. With real-time battlespace awareness, the CSG and ESG can deliver high-volume, lethal fires against critical vulnerabilities, defeating the enemy's strategy early in the conflict. Sea Strike will improve the dynamic application of persistent Intelligence, Surveillance, and

[131] Zortman, Massenburg and Kilkline, Thomas J., Jr, *Naval Aviation Vision 2020*, 156.

> Reconnaissance (ISR), Time Sensitive Strikes (TSS), Ship-to-Objective Maneuver (STOM), IO, and covert strike to deliver devastating power and accuracy. Sea Strike capitalizes on early war-termination opportunities that would be lost under attrition-oriented warfare, and the strategic flexibility and operational independence of our CSGs and ESGs enables us to take the fight to the enemy – on our terms.[132]

Within this conceptual framework, the large-deck nuclear super carrier continues to be the naval formation centerpiece. Current global threat environments critical to U.S. security interests in the form of small to medium level conflicts that are characterized by terrorism and irregular warfare do not require the ability to deliver high-volume lethal fires against critical vulnerabilities. The CVN is too costly and masses excessive firepower for this scenario. What the Falklands War case study and Naval Aviation Vision 2020 do indicate is the requirement for persistent low-intensity precise firepower to be delivered on notice, yet sporadically, coupled with information dominance. In this scenario, ships of the ESG type class are the force configuration that is needed to more accurately address the current threat environment.

In the following chapter, the thesis will examine the lessons of each of the case studies and analyze them against national security, military and naval strategies through a lens of the current threat environment.

---

[132] Zortman, Massenburg and Thomas J. Kilkline Jr., *Naval Aviation Vision 2020*, 156.

THIS PAGE INTENTIONALLY LEFT BLANK

V. ANALYSIS

Debates regarding large-deck vs. small and medium sea-based air platforms have been conducted on more than one occasion in the past. The issue not only concerns the size of the ship, but also whether it should be nuclear or conventionally propelled.[133] There was also debate concerning the emphasis and size placed on the U.S. Navy within the Maritime Strategy during the Reagan administration regarding aircraft carriers' ability to deter and engage the Soviet Union. One view suggested that the budget invested in the naval build-up should be redirected towards NATO ground and air forces.[134] When Admiral Elmo Zumwalt became the Chief of Naval Operations in 1970,[135] and with an unpopular Vietnam War and weak economy, Congress began considering reductions in the DoD budget. Admiral Zumwalt introduced an idea, borrowed from the British, for a less expensive, smaller aircraft carrier. "His sea-control ship, similar to the new HMS *Invincible*, would operate about

---

[133] CVX Propulsion System Decision. The RAND Corporation conducted a study in 1998 that examined the industrial base implications of nuclear vs. conventional propulsion for CVX (CVN-21). The analysis showed that neither a nuclear CVX nor a non-nuclear CVX would affect the conventional propulsion industrial base. However, the nuclear industrial base may be affected by the demand for either a nuclear or non-nuclear CVX. If CVX were conventional, the cost of components for other Navy nuclear programs would increase. One can deduce from this the power of the institutional inertia supporting naval aviation leadership in favor of a large-deck nuclear carrier.

[134] Linton F. Brooks, "Naval Power and National Security: The Case for the Maritime Strategy," *International Security* 11, no. 2 (Autumn, 1986), 58-88, http://www.jstor.org/stable/2538958. John Mearsheimer takes an opposing view to Brooks in this issue.

[135] Naval Historical Center, "Admiral Elmo Russell Zumwalt, Jr., USN," Naval Historical Center, http://www.history.navy.mil/faqs/faq93-1.htm (accessed June 13, 2008).

ten helicopters and ten AV-8s for limited ASW, strike, and air-defense missions." In opposition to his senior aviation advisors, Admiral Zumwalt believed that more small carriers would be more valuable to the Navy than few large carriers.[136]

In June 2000, after a four-year formal Analysis of Alternatives (AoA) plus three high-level reviews by the Office of the Secretary of Defense, the Defense Acquisition Board approved the U.S. Navy's plan to develop a new class of large-deck nuclear-powered aircraft carriers; CVN-21.[137] In an article of the June 2001 *Proceedings* of the U.S. Naval Institute, David A. Perin discusses the alternatives that were considered and rejected. He states in the article, "the least radical alternative was a mid-sized carrier similar to the *Midway* (CV-41). It was determined that mid-sized carriers were a little cheaper but provide a lot less combat power." The data indicated that large decks could generate more sorties and devote the additional sorties to strike missions, and that "a new 75-plane CVX force can generate roughly twice the number of strike sorties as the same number of a (mid-sized) 55-plane carrier." Perin continues, regarding proposals for small carriers; a "more radical alternative involved a combination of small carriers and other systems, such as land-based aircraft, missile ships, and even large mobile offshore bases." The AoA found that "one small carrier doesn't carry enough aircraft, and that the CVX mission-need-statement calls for CVX to conduct

---

[136] Charles H. Brown, "Up, Up and Away," *Proceedings of the U.S. Naval Institute* 127, no. 8 (August 2001), 36-40.

[137] Dave A. Perin, "Are Big Decks Still the Answer?" *Proceedings of the U.S. Naval Institute* 126, no. 6 (June 2001), 30-33.

simultaneous strike and battlespace dominance operations, and that a small carrier doesn't carry enough aircraft to meet this fundamental criterion." Where it was determined that two small carriers could accomplish what one large-deck CVX could do, the CVX AoA found that "two small carriers could do the job but would cost too much, indicating that a CVX large-deck costs less than two-thirds as much to buy and operate as two comparable 40-plane CVX's"[138] Perin argues that STOVL and small carriers are different issues, he states, "…STOVL JSF will likely operate from carriers on some occasions, and might eventually prove desirable for regular carrier application, but this would not change the argument against small decks for the Navy. For example, proponents of STOVL often argue that it would provide more flexible launch and recovery operations on a carrier…the AoA showed that if realized, the advantages would be more important for large carriers that have many aircraft on deck. Conversely, the AoA showed that STOVL aircraft are not needed for an efficient 40-plane carrier design. In sum, STOVL aircraft and carrier size are separate issues. STOVL aircraft make sense for the Marine Corps and perhaps eventually for the Navy. Small carriers don't make sense for the Navy, even with STOVL aircraft."[139] What Perin, who was a member of the AoA during these deliberations, did not envision, was the asymmetric threats that large decks have been called upon to address, and that they are an inefficient platform for the mission. He minimized the aspect of CVN vulnerability based on historical fact that

---

[138] Dave A. Perin, "Are Big Decks Still the Answer?" *Proceedings of the U.S. Naval Institute* 126, no. 6 (June 2001), 30-33.

[139] Ibid., 32.

antiship missile attacks have been very limited, and that the victims were defenseless or unalerted.

Despite the debate and analysis conducted in the past regarding the feasibility of incorporating sea-based air platforms in the form of medium or small air-capable ships, the status quo has been maintained under the premise that a CVN is the right platform for the current and foreseeable strategic threat environment. Carrier aviation leaders have fought the concept of a small aircraft carrier from the birth of Admiral Zumwalt's sea-control ship. Their view is that large-deck carriers are more effective than any number of smaller carriers. A large carrier embarks more aircraft, fuel, and ammunition, giving the air wing more staying power; it is also more survivable, through the use of armor, defensive armament, and passive weapon counter-measure systems.[140] In an age of maneuverable guided antiship cruise missiles of supersonic speed, survivability is a calculated guess. Despite the survivability factors mentioned, the CVN is dependent on maneuvering with its surface ship strike force for protection to enable defense-in-depth, at considerable costs; costs that could go to offensive capabilities rather than defense of a ship. Regarding the stated higher degree of effectiveness, the concentration of striking power in a single platform makes it a high value target that any determined adversary would be foolish not to neutralize.

The great advance in modern strike warfare has been the increase in precision, brought about by the advance in guided munitions. This has resulted in a shift of U.S. joint

[140] Brown, *Up, Up and Away*, 36-40.

doctrine to *effects-based* strikes; rather than measuring performance by number of sorties or tonnage of bombs delivered. Highly specific targeting of a precise location of an enemy and/or critical infrastructure is to be conducted at a time of our choosing to overwhelm an adversary with the intent to minimize, as much as feasibly possible, the potential fallout of collateral damage – to bring about the strategic end state. Has the advancement in guidance precision altered the need for sea-based air power operating from super carriers? Yes. There is less need for high sortie rates. The following information supports this.

The ability to kill a target is the result of the interplay of two factors: the ability to get a warhead near a target (guidance precision), and the destructive power of the warhead. Guidance technology has in effect doubled the effectiveness of the warhead's explosive package over the last 50 years.[141] The reason for the high probability of impact of the modern warhead is CEP (Circular Error Probable) distance vs. destructive radius, in that, a target's center lies within the destructive blast radius of modern precision guided warheads. The number of weapons it takes to kill a target is dependent on the weapon's CEP and the destructiveness of its warhead. It has been asserted that as a result of these improvements, the number of weapons it takes to kill a target has been falling rapidly, and it now only takes a single modern strike fighter to accomplish what an entire fleet of WWII era aircraft did.

---

[141] James H. Irvine, *The Strike and Cost Effectiveness of a Modern Aircraft Carrier, WWII to the Near Term Future in Historical Prospective* (Naval Air Warfare Center: Weapons Division, RMA Center, Car.2, 2007). Note: This is a Power Point presentation brief.

According to an analysis conducted by the Naval Air Warfare Center (NAWC) Weapons Division-Revolution in Military Affairs Center, “a WWII strategic bomber had a CEP of 1,744 ft., which meant it took 2,794 WWII 500lb bombs to kill a point target. This equates to the full bomb load of 175 B-17 bombers. If one equates this to a modern strike fighter and the four precision weapons it can carry, the modern strike fighter equates to 700 WWII B-17’s in a strategic bombardment role.”[142] NAWC’s analysis probes further, “In WWII, the CEP of tactical fighter bombers was significantly better than that of their strategic counterparts; this was primarily the result of their operating at much lower altitudes and applying different bombing techniques. A tactical fighter bomber of the WWII era had an average CEP of 321.3 ft. Fighter bombers of that era normally attacked structural point targets with one larger 1,000lb bomb. Because it took one fighter bomber to deliver one bomb, it took the combined efforts of 41 WWII fighter bombers to kill a point target in the WWII era. If one equates this to the four precision guided weapons that can be carried by a modern strike fighter, the modern strike fighter is equivalent to 164 WWII fighter bombers in a tactical strike role”. A WWII aircraft carrier had about 90 aircraft, depending on type. Therefore it could launch a maximum single wave strike of about 80 aircraft, suggesting that a single modern F/A-18E/F carrier strike fighter armed with

[142] James H. Irvine, *The Strike and Cost Effectiveness of a Modern Aircraft Carrier, WWII to the Near Term Future in Historical Prospective* (Naval Air Warfare Center: Naval Air Warfare Center, Weapons Division, 2007).

its four unitary JSOWs (Joint Standoff Weapon) or LGBs (Laser-guided bomb) is the strike equivalent of two WWII carriers.[143]

NAWC's analysis neglects to indicate that this scenario would most likely apply in only limited conditions, although an order of magnitude advance seems appropriate, or perhaps two with conditions envisioned by NAWC. Attenuating factors are:

1. If air superiority is in dispute, then first, many of the F/A-18s must assume a fighter role so cannot deliver ordnance.

2. Each F/A-18 lost in air combat or in weapon delivery is in NAWC terms the equivalent of losing two WWII CV deck-loads of strike aircraft.

3. If an F/A-18 carries ordnance for multiple targets, it must travel to each target separately which adds to its exposure and risk.[144]

Based on NAWC’s analysis it could feasibly be concluded that for such efficient lethality the U.S. would not need a force of 12 or so CVNs to match our past capability, lest the occasion to be in several places simultaneously, and therefore we should distribute these highly lethal strike aircraft into smaller CVs (to be called CVLs for the designation given to the small fast aircraft carriers of the

---

[143] James H. Irvine, *The Strike and Cost Effectiveness of a Modern Aircraft Carrier, WWII to the Near Term Future in Historical Prospective* (Naval Air Warfare Center: Naval Air Warfare Center, Weapons Division, 2007).

WWII era)[145] that can launch and land them. Accepting NAWC's carrier-effectiveness analysis at face value, a CVL fleet with a deck-load of 20, or even 10, F/A-18s in each would be more flexible, more distributable, and more survivable and well worth the additional cost of building smaller "less efficient" aircraft carriers. Moreover one may surmise the best way to exploit the greatly improved strike accuracy to which NAWC correctly points is to deliver the precision strikes from a STOVL (F-35B) flying from a very small CV. There are size minimums for launch/landing CTOL that don't apply to STOVL. To a first approximation, whatever an F/A-18 can deliver an F-35B STOVL could deliver as well, and at a greater range without refueling. Another deduction relating to true cost effectiveness is that if one asserts that a new system is twice as effective as the system it replaces, then by definition, for equal effectiveness one only needs to procure half as many of the new system.[146] If for example, we observe the scope of current operations, the U.S. Navy does not need the amount of aircraft for these contingencies.

What OEF and OIF showed was that U.S. sea-based air power produced sortie rates that delivered ordnance of less

---

[144] Hughes, Wayne P., Jr, Discussion and Analysis of NAWCWD-RMA: The Strike and Cost Effectiveness of a Modern Aircraft Carrier WWII to the Near Term Future in Historical Prospective-NAWCWD-RMA-CAR.2 by James H. Irvine, May 8, 2008.

[145] Naval Historical Center, "CVL-Small Aircraft Carriers," Department of the Navy-Naval Historical Center, http://www.history.navy.mil/photos/shusn-no/cvl-no.htm (accessed May 15, 2008).

[146] Hughes, Wayne P., Jr, *Discussion and Analysis of NAWCWD-RMA: The Strike and Cost Effectiveness of a Modern Aircraft Carrier WWII to the Near Term Future in Historical Perspective-NAWCWD-RMA-CAR.2 by James H. Irvine*, 1-2-91.

than thirty and fourteen percent of the total U.S. effort, respectively. CVN-21, costing at least eight billion USD plus per ship, is designed to boost sortie rates up another 25 percent at “lower costs”, so that carrier aviation could “participate” in the large sortie arena with the Air Force. That is not what is needed; fire power effects were achieved within relatively short periods of time when needed. CVNs concentrate too much undistributed firepower for the more common, long duration, medium to low intensity conflict scenario.

Defense Secretary Robert M. Gates desires the U.S. military to “prepare more for fighting future wars against insurgents and militias such as those in Iraq and Afghanistan, rather than spending so much time and money preparing for conventional conflicts.” In unusually strong language, Secretary Gates was recently quoted by the Washington Post,[147] and warned against what he described as a tendency in the Pentagon to fall back on Cold War mentalities, he said he feared that “lessons from the U.S. struggle against insurgencies in Iraq could fade unless military commanders understand that today's enemies are the foes of the future.” Gates said there must be a balance between “meeting today's demands and tomorrow's contingencies,” but he expressed concern that the defense establishment is not concentrating hard enough on what might be needed in future conflicts. He said the armed services

[147] Josh White, "Defense Secretary Urges Military to Mold itself to Fight Iraq-Style Wars," *The Washington Post* Wednesday (May 14, 2008), A04, http://www.washingtonpost.com/wp-dyn/content/article/2008/05/13/AR2008051301265.html (accessed 15 May 2008).

and their corporate counterparts should steer technology and resources toward battling insurgencies.

> Overall, the kinds of capabilities we will most likely need in the years ahead will often resemble the kinds of capabilities we need today, what we must guard against is the kind of backsliding that has occurred in the past, where if nature takes its course, these kinds of capabilities -- that is, counterinsurgency - tend to wither on the vine.

Secretary Gates indicated that wars of the past quarter-century point to a need for counterinsurgency strength, including conflicts involving the Soviets in Afghanistan, the Israelis in Lebanon and Americans in Somalia, Afghanistan, and Iraq.

> Smaller, irregular forces - insurgents, guerrillas, terrorists - will find ways, as they always have, to frustrate and neutralize the advantages of larger, regular militaries," Gates said. "And even nation-states will try to exploit our perceived vulnerabilities in an asymmetric way, rather than play to our inherent strengths.

Secretary Gates said the U.S. military "would be hard-pressed to launch a major conventional ground operation elsewhere in the world at this time," and added: "Where would we sensibly do that? The United States has ample and untapped combat power in our naval and air forces, with the capacity to defeat any, repeat any, adversary who committed an act of aggression, whether in the Persian Gulf, on the

Korean Peninsula, or in the Straits of Taiwan. There is a risk, but it is a prudent and manageable one."[148]

"Counterinsurgency strength" is embodied in alternatives to how the U.S. and particularly the U.S. Navy is configured today. The advent of modern technology and smart weapons make the need for super carriers less important. Adapting existing super carriers to modern warfare makes sense, but building exclusively large-deck carriers in today's environment does not. U.S. sea-based air power must configure itself to confront asymmetric low-intensity irregular warfare with a view to supporting ground forces and SOF from the sea with the appropriate sea-based air platform. Flexibility, endurance, remote control and persistence coupled with an intelligent weapon system that can be made to perform from long distances present a viable dispersed alternative to deploying a super carrier and its vast support and defense system. Light aircraft carriers, coupled with the above cost-effective alternatives and equipped with capable modern STOVL aircraft, are a must in view of the above comments made by the Secretary of Defense. Here is an anecdote that briefly illustrates the notion:

> Indian Springs, Nevada - The sniper never knew what hit him. The Marines patrolling the street below were taking fire, but did not have a clear shot at the third-story window that the sniper was shooting from. They were pinned down and called for reinforcements. Help came from a Predator drone circling the skies 20 miles away. As the unmanned plane closed in, the infrared

---

148 Josh White, "Defense Secretary Urges Military to Mold itself to Fight Iraq-Style Wars," *The Washington Post* Wednesday (May 14, 2008), A04, http://www.washingtonpost.com/wp-dyn/content/article/2008/05/13/AR2008051301265.html (accessed 15 May 2008).

> camera underneath its nose picked up the muzzle flashes from the window. The sniper was still firing when the Predator's 100-pound Hellfire missile came through the window and eliminated the threat. The airman who fired that missile was 8,000 miles away, at Creech Air Force Base, NV, home of the 432nd air wing. The 432nd officially "stood up," on May 1, 2007. One year later, two dozen of its drones patrol the skies over Iraq and Afghanistan every hour of every day. And almost all of them are flown by two-man crews sitting in the relative safety of a ground control station (GCS) in the Nevada desert.[149]

There are several validated and promising innovations to air power that undermine the need for a large-deck nuclear carrier, in low to medium intensity conflict. Specifically, below is a brief survey of just a few:

UAVs. The MQ-9 Reaper is the bigger sibling of the RQ-1/MQ-1 Predator UAV. Capable of striking enemy targets with on-board weapons, the MQ-9 Reaper UAV has conducted CAS and ISR missions. Operational use of Reaper's advanced capabilities marks a step forward in the evolution of unmanned aerial systems. The Reaper is larger and more heavily-armed than the MQ-1 Predator. In addition to its traditional ISR capabilities, it is designed to attack time-sensitive targets with persistence and precision, and destroy or disable those targets. The MQ-9 has nearly nine times the range, can fly twice as high and carries more munitions. It can carry nearly the same payload as an F-16, typically two 500-pound laser-guided bombs and four AGM-114

---

[149] Brian M. Carney, "Air Combat by Remote Control," *Wall Street Journal* (May 12, 2008), A13, http://online.wsj.com/article/SB121055519404984109.html?mod=opinion_main_commentaries (accessed 12 May 2008).

Hellfire missiles.[150] Unit system cost is $53.5 million in 2006 fiscal dollars which includes four aircraft (unfortunately a small number) with sensors.[151]

Warrior UAV. For the near future, the U.S. Army has initiated procurement of an Extended Range Multi-Purpose unmanned aerial vehicle named the "Warrior." The ERMP Warrior will have the longest range of any UAV system in the Army; it will have multiple on-board weapons capable of loitering over enemy territories for 36 hours at altitudes up to 25,000 feet.[152] The Army intends to procure 11 Warrior systems, each with 12 aerial vehicles. The new UAV will be capable of executing missions such as reconnaissance, communications relay, and attack with its multiple weapons, and its network connectivity will reduce the sensor-to-shooter time to better suppress enemy threats. Initial operational capability is expected in fiscal year 2009. Total program cost is expected to be about $1 billion.[153]

Vulture. Further into the future, a revolutionary program is being developed by the Defense Advanced Research Projects Agency's (DARPA) Tactical Technology Office called "Vulture". The objective of the Vulture program is to develop an aircraft capable of remaining on-station

---

[150] U.S. Air Force, "Reaper UAV Now Flying in Afghanistan," Air Force Link, http://www.af.mil/news/story.asp?storyID=123071575 (accessed May 12, 2008).

[151] U.S. Air Force, "Factsheets: MQ-9 Reaper," Air Force Link, http://www.af.mil/factsheets/factsheet.asp?fsID=6405 (accessed May 12, 2008).

[152] U.S. Army, "Army Awards 'Warrior' Long Range UAV Contract," Army News Service, http://www4.army.mil/news/article.php?story=7722 (accessed May 12, 2008).

[153] Ibid.

uninterrupted for over five years to perform ISR, and communication missions over an area of interest.[154] Once fielded, it's logical to expect this technology to evolve into an armed version capable of striking time-sensitive targets.

Tactical Land Attack Missile (TLAM). The Office of Naval Research (ONR) has been pursuing a supersonic land-attack missile design since 2004 under the Revolutionary Approach to Time-Critical Long-Range Strike (RATTLRS) technology demonstration program for a successor to the BGM-109 Tomahawk. It aims to show the viability of a high-speed (Mach 3+) cruise missile that could attack fleeting vehicles on land and ships at sea as well as stationary objects in conditions under which the ability to hit targets quickly (500NM in 15 min.) is paramount. The program is in development, and, if the RATTLRS demonstration program is successful it hopes to have an operational version around 2012.[155]

Affordable Weapon System (AWS). In March 2002 the Office of Naval Research was reported to be developing a long-range, low-cost Affordable Missile or Affordable Weapon System (AWS) to complement Tomahawk or successive long-range systems, capable of speeds up to 200 knots and a range of 400-600 nautical miles but costing only $30,000 USD. The AWS

---

[154] Daniel Newman, "Vulture," Defense Advanced Research Projects Agency, Tactical Technology Office, http://www.darpa.mil/tto/Programs/Vulture.htm (accessed May 12, 2008).

[155] Jane's Information Group, "Tomahawk/Affordable Weapon System RGM/UGM-109 B/C," Jane's, http://www8.janes.com/JDIC/JDET/documentView.do?docId=/content1/janesdata/binder/jnws/jnws0162.htm@current&pageSelected=&keyword=Tomahawk&backPath=http://jdet.janes.com/JDIC/JDET&Prod_Name=JNWS&activeNav=http://www8.janes.com/JDIC/JDET (accessed February 22, 2008).

is designed to provide a complementary system to long-range land-attack missiles such as Tomahawk using commercially-based technology. It is equipped with line-of-sight and satellite data links and can fly direct to the target at distances of 600 nautical miles using GPS and INS guidance. There it can loiter for between four and six hours before delivering a 200-lb warhead with precision. A forward observer can re-target the weapon in flight, and the weapon can be called onto a target within a minute. AWS is expected to be launched from a 20-round box launcher, which could be installed on smaller surface warships or even amphibious warfare vessels.[156]

In a classic work on military resistance to change, *Men, Machines, and Modern Times*, the late MIT professor Elting E. Morison explains how difficult it is for military organizations to abandon familiar weapon systems. He cites the instance of the first U.S. Navy ship constructed from the beginning with steam propulsion, albeit with sails as well. This was the USS Wampanoag, commissioned in 1866. It could literally run circles around sailing warships whose freedom of maneuver was restricted by the direction and force of the wind. The Navy, though, decommissioned the Wampanoag in 1868. A board of officers decreed, in part, that it would be injurious to the fighting spirit of the captain of a ship if he could not see and direct every element of his ship from his position on deck. Men in an

---

[156] Jane's Information Group, "Tomahawk/Affordable Weapon System RGM/UGM-109 B/C," Jane's, http://www8.janes.com/JDIC/JDET/documentView.do?docId=/content1/janesdata/binder/jnws/jnws0162.htm@current&pageSelected=&keyword=Tomahawk&backPath=http://jdet.janes.com/JDIC/JDET&Prod_Name=JNWS&activeNav=http://www8.janes.com/JDIC/JDET (accessed February 22, 2008).

engine room would be outside of the captain's control. This new concept of a steam plant below decks was just too revolutionary to win acceptance quickly. Despite the rest of the leading navies of the world doing so, the U.S. Navy did not build another warship with steam propulsion for 15 years. Arguments for the much greater operational effectiveness of steam propulsion just could not compete with the long tradition of sail. In this tradition, there is no visible inclination in Navy circles today to evaluate whether a carrier-centric Navy is what best suits our nation's needs on the seas today and tomorrow. At the same time, one does not have to do much more than scratch the surface to see that substantial changes in weapons systems are taking place. Startling new technologies are becoming available.

These developments of increased accuracy and remote control of weapons mean that there is less need for large carriers with large numbers of aircraft and large amounts of ammunition. A few aircraft with precise weapons can accomplish what traditionally has taken much greater effort. Even more startling, manned aircraft are needed less. Missiles can be launched from ships or submarines hundreds of miles away from a target and remotely aimed and guided. In addition, political circumstances today do not easily allow the large quantities of munitions that putative targets of the Cold War era did. For years our carriers practiced "Alpha Strikes" against the Soviet Union and its allies. These involved as many aircraft as could be loaded and launched in a single strike, each with a maximum bomb load. With the possible exception of China, there is not likely to be a demand for Alpha Strikes in a world of

counter-insurgency and counter-terrorist operations. Warfare at sea, then, is inexorably moving in the direction of unmanned, remotely controlled weapons that are highly accurate and launched at long distances from their targets. This, of course, means less exposure for pilots or none if missiles are launched well away from the target. That can be an important factor in smaller contingencies where U.S. interests are less than vital, but where we opt to fight nonetheless. It can also mean less collateral damage, which can be very important in wars where winning hearts and minds is the key.[157]

In a study conducted by the DoD Office of Force Transformation (OFT) headed by the late Arthur Cebrowski titled *Alternative Fleet Architecture Design*,[158] the challenges of accurately identifying the appropriate composition of the fleet based on forecasting the strategic threat in the immediate future and the uncertainties of escalating procurement costs in an attempt to achieve the hoped-for 375 ship navy are succinctly articulated. The theory of network-centric warfare, including the important advantages available to the warfighter through the full or partial implementation of network-centric capabilities, networking at all levels of military operations, and networked behavior, provides the basis for one of the key design principles for developing an alternative fleet platform architecture. Networking allows for a modular,

---

[157] Stansfield Turner, "AIRCRAFT CARRIERS are on their Way OUT," *United States Naval Institute Proceedings* 132, no. 7 (July 2006), 16, http://proquest.umi.com/pqdweb?did=1081643121&Fmt=7&clientId=65345&RQT=309&VName=PQD.

[158] Johnson and Cebrowski, *Alternative Fleet Architechture Design*, 55-56-64.

building block approach to military scaling with applicability across a broad spectrum of missions. Furthermore, the architecture of a fleet with dispersed networked surveillance, weapons, and command and control (C2) means that platform size can be reduced, while increasing performance through networking of an increased number of platforms. As platform size is decreased, advances in precision and terminal blast effects hold the potential to maintain firepower without losing lethality. Technologies are being developed to: lighten the payload, thereby extending the endurance and range of unmanned systems; provide robust data links and integrated sensors to detect and target low signature threats; and provide electronic warfare (EW) technology and anti-submarine warfare (ASW) technology tailored to threats in the littoral.

Breakthroughs in technology provide the Navy with the opportunity to leap ahead to deliver a fleet far more capable than the programmed fleet. High leverage technologies and the potential payoff they offer the fleet are shown in Figure 1.

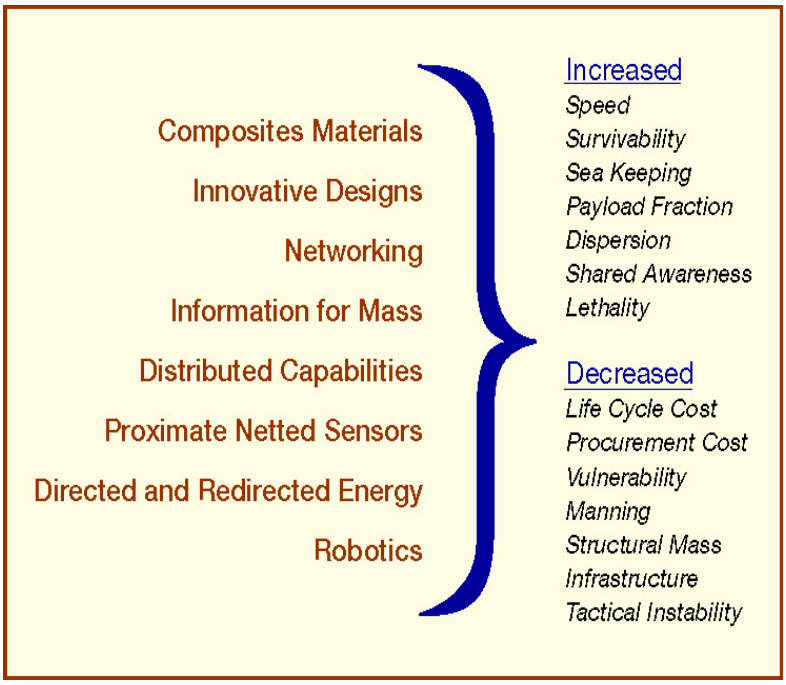

Figure 1. Technology…Opportunities and Payoff[159]

The firepower of the U.S. Navy and USAF are often a duplication of effect when projecting power over land. It is not a duplication of effort in the manner, way or conduit for delivering the firepower; it is feasible to realize that the U.S. Navy and USAF pros and cons could offset each other to enable overland strikes. Thus, the USN requires sea-based air power for overland power projection, and more importantly, sea-based operations in general, but it should be more distributed, given the prospects of modern technology and the global strategic environment. NWDC's analysis makes a strong argument for the firepower capability of a CVN, and in doing so, also illustrates the concentration of firepower in one platform, which lends

[159] Johnson and Cebrowski, *Alternative Fleet Architechture Design*, 55-56-64.

itself to the notion of vulnerability. In OEF and OIF, the preponderance of sortie generation and ordnance delivered came from the USAF, despite massing several carriers in theater. Further, sortie generation capacity of each CVN wasn’t maximized throughout the effort. These factors and the study conducted by the DoD OFT suggest that U.S. naval aviation should seriously consider procurement of smaller, more cost effective sea-based air platforms that would allow flexibility in tailoring the platform to changing campaign requirements without losing lethality.

VI. CONCLUSION

The U.S. National Security Strategy states that America is at war against the rise of terrorism, a war that is fueled by an aggressive ideology of hatred and murder.[160] The NSS also states that "defeating terrorists requires a long-term strategy and a break with old patterns; we can no longer rely on deterrence to keep terrorists at bay." The NSS provides four pillars for the way ahead in addressing this threat:

1. Prevent attacks by terrorist networks before they occur.

2. Deny weapons of mass destruction (WMD) to rogue states and to terrorist allies who would use them without hesitation.

3. Deny terrorist groups the support and sanctuary of rogue states.

4. Deny the terrorists control of any nation that they would use as a base and launching pad for terror.[161]

In support of the NSS, the U.S. National Defense Strategy calls for *continuous transformation.* The NDS states that "continuous defense transformation is part of a wider governmental effort to transform America's national security institutions to meet 21st century challenges and opportunities. Just as our challenges change continuously,

---

160 George W. Bush, "The National Security Strategy of the United States of America," The White House, http://www.whitehouse.gov/nsc/nss/2006/nss2006.pdf (accessed June 1, 2008).

161 Ibid.

so too must our military capabilities." The NDS also states that transformation is not only about technology; it is also about:

1. Changing the way we think about challenges and opportunities;

2. Adapting the defense establishment to that new perspective; and,

3. Refocusing capabilities to meet future challenges, not those we are already most prepared to meet.[162]

The NDS also addresses irregular warfare and states that "it will be a key conflict for the foreseeable future. Challenges from terrorist extremist organizations and their state and non-state supporters will involve our forces in complex security problems for some time to come, redefining past conceptions of general purpose forces."[163]

To guide American military forces within this global threat environment, the Quadrennial Defense Review envisions a joint maritime force that "will conduct highly distributed operations with a networked fleet that is more capable of projecting power in the *brown* and *green* waters of coastal areas."[164]

---

[162] Donald H. Rumsfeld, "National Defense Strategy of the United States of America," Office of the Secretary of Defense, http://www.au.af.mil/au/awc/awcgate/nds/nds.pdf (accessed September 6, 2007).

[163] Ibid.

[164] Donald H. Rumsfeld, *Quadrennial Defense Review Report* (1000 Defense Pentagon, Washignton D.C. 20301-1000: Department of Defense, 2006), http://www.defenselink.mil/qdr/report/Report20060203.pdf (accessed September 6, 2007).

The U.S. National Military Strategy discusses overseas presence posture of U.S. military forces and states that "enhancing U.S. overseas presence and global footprint must improve the ability of regional forces to employ an expeditionary approach in response to regional and global contingencies. They must remain *scalable,* supporting plans to surge forces during crisis when and where they are needed."[165]

In light of these national strategic guiding points, the U.S. Navy should seriously reconsider its requirement of maintaining the size of its current fleet of super carriers. It should explore an immediate shift in procurement strategy to more appropriately address threats to national security. This thesis concludes that one important and advantageous change should be not to spend on solely large-deck carriers. To smoothly transform naval aviation, the Navy should invest in a blend of CVNs and small to medium carriers, be they nuclear or conventional. Smaller "CVLs" provide two important capabilities we must seek:

1. It allows naval aviation to engage a peer adversary in a more distributed manner; and,

2. It allows naval aviation to appropriately tailor the size of a carrier strike group in small to medium intensity conflict scenarios, some of which will be of long duration.

---

[165] Richard B. Myers, "National Military Strategy of the United States of America," Chairman of the Joint Chiefs of Staff, http://www.defenselink.mil/news/Mar2005/d20050318nms.pdf (accessed September 6, 2007).

Many other world navies do well and are content with the idea of aircraft carriers of 40,000 ton displacement and less. The USN does not give the “CV” classification to ships within its navy which however are comparable in size and capability to ships which other navies are proud to call aircraft carriers.[166] The key point is - that sea-based air is not as critical to the national security as in past eras, but it can, and should be, deliverable in smaller packages tailored to the situation. This is especially so when more cost effective methods to embark sea-based air power exist. It is far less costly and risky to embark and operate V/STOL aircraft in a combat situation than attempting to recover CTOL aircraft aboard a carrier, in difficult conditions, that are in a tank-or-eject situation, as described in the OEF case analysis - an *avoidable* risk. The procurement, operating and maintenance costs of large-deck carriers with catapult and arresting gear is higher than that for a small or medium sized air capable V/STOL ship. This type of ship, - a “CVL” - with an embarked air wing of highly capable strike/fighters of the JSF type, UAV/UCAVs or V-22 Ospreys, can be configured for many missions to include airborne early warning. They will make for a highly viable complement, or potential alternative to CVNs.

[166] Hore and Hirschfeld, *Maritime Aviation, Light and Medium Aircraft Carriers into the Twenty First Century*, 17.

LIST OF REFERENCES

Arquilla, John. *Militaries and Technological Change, SO4104*, Edited by Class 072-699, Cruz, Yniol. Vol. classroom discussion & e-mail re: infallible aircraft carrier 2007.

Arquilla, John and Maria M. Rasmussen. "The Origins of the South Atlantic War." *Journal of Latin American Studies* 33, no. 4 (2001, 2001): 739-775, http://links.jstor.org (accessed March 11, 2008).

BBC News. "Fight for the Falklands, Twenty Years on." BBC News.co.uk. http://news.bbc.co.uk/hi/english/static/in_depth/uk/2002/falklands/guide.stm (accessed March 6, 2008).

Boyne, Walter J. "Apaches at Anaconda." Chap. Appendix 4, In *Operation Iraqi Freedom: What Went Right, what Went Wrong, and Why*, 261-262-265. New York, NY 10010: Tom Doherty Associates, LLC, 2003.

———. "Lessons Learned and the Fight to Win the Peace." Chap. 8, In *Operation Iraqi Freedom: What Went Right, what Went Wrong, and Why*, 161-183. New York, NY 10010: Tom Doherty Associates, LLC, 2003.

Brooks, Linton F. "Naval Power and National Security: The Case for the Maritime Strategy." *International Security* 11, no. 2 (Autumn, 1986): 58-88, http://www.jstor.org/stable/2538958.

Brown, Charles H. "Up, Up and Away." *Proceedings of the U.S. Naval Institute* 127, no. 8 (August 2001): 36-40.

Bush, George W. "The National Security Strategy of the United States of America." The White House. http://www.whitehouse.gov/nsc/nss/2006/nss2006.pdf (accessed June 1, 2008).

Carney, Brian M. "Air Combat by Remote Control." *Wall Street Journal* (May 12, 2008): A13, http://online.wsj.com/article/SB121055519404984109.html?mod=opinion_main_commentaries (accessed 12 May 2008).

Conetta, Carl. *Strange Victory: A Critical Appraisal of Operation Enduring Freedom and the Afghanistan War*. Cambridge, Massachusetts: Project on Defense Alternatives, 2002.

Conway, James T., Roughead, Gary and Allen, Thad W. "A Cooperative Strategy for 21st Century Seapower." U.S. Navy & Marine Corps, U.S. Coast Guard. http://www.navy.mil/maritime/MaritimeStrategy.pdf (accessed May 15, 2008).

Cordesman, Anthony H. *The Lessons of Afghanistan: War Fighting, Intelligence, and Force Transformation*. Significant Issues Series. Vol. 24, #4. Washington, D.C.: Center for Strategic and International Studies, 2002.

Faculty and Students. "SEA ARCHER Distributed Aviation Platform." Masters of Science, Naval Postgraduate School, 2001.

Friedman, Norman. *Terrorism, Afghanistan and America's New Way of War*. Annapolis, MD 21402: US Naval Institute Press, 2003.

Funnell, Ray G. "It was a Bit of a Close Call: Some Thoughts on the South Atlantic War." Chap. 9, In *The War in the Air 1914-1994*, edited by Alan Stephens. American Edition ed., 221-256. Maxwell Air Force Base, Alabama: Air University Press, 2001.

Gordon, John, Peter A. Wilson, John Birkler, Steven Boraz, and Gordon T. Lee. *Leveraging America's Aircraft Carrier Capabilities, Exploring New Combat and Noncombat Roles and Missions for the U.S. Carrier Fleet*. Santa Monica, CA 90407-2138: RAND Corporation, 2006.

Grant, Rebecca. *Battle-Tested: Carrier Aviation in Afghanistan and Iraq*. Washington, D.C.: IRIS Press, 2005.

———. "Decisive Combat Operations." Chap. 9, In *Battle-Tested, Carrier Aviation in Afghanistan and Iraq*, 149-150-173. Washington DC 20002: IRIS Press, 2005.

Ham, Walter T. IV. "'Presence with a Purpose' - CNO Explains Fleet Response Plan." U.S. Navy. http://www.navy.mil/search/display.asp?story_id=9060 (accessed May 15, 2008).

Hastings, Max and Simon Jenkins. "Task Force." Chap. 5, In *The Battle for the Falklands*. First American Edition 1983 ed., 72-73-97. New York, NY 10110: W.W. Norton and Company, Inc., 1983.

Hore, Peter and Thomas J. Hirschfeld, eds. *Maritime Aviation, Light and Medium Aircraft Carriers into the Twenty First Century*. The University of Hull Press, Cottingham Road, Hull: Royal Navy Defence Studies, 1999.

Hughes, Wayne P., Jr. *Discussion and Analysis of NAWCWD-RMA: The Strike and Cost Effectiveness of a Modern Aircraft Carrier WWII to the Near Term Future in Historical Prospective-NAWCWD-RMA-CAR.2 by James H. Irvine*, Edited by Yniol A. Cruz. Vol. Brief. Naval Air Warfare Center: Naval Air Warfare Center Weapons Division Revolution in Military Affairs Center, 2008.

Irvine, James H. *The Strike and Cost Effectiveness of a Modern Aircraft Carrier, WWII to the Near Term Future in Historical Prospective*. Naval Air Warfare Center: Naval Air Warfare Center, Weapons Division, 2007.

Jane's Information Group. "Tomahawk/Affordable Weapon System RGM/UGM-109 B/C." Jane's. http://www8.janes.com/JDIC/JDET/documentView.do?docId=/content1/janesdata/binder/jnws/jnws0162.htm@current&pageSelected=&keyword=Tomahawk&backPath=http://jdet.janes.com/JDIC/JDET&Prod_Name=JNWS&activeNav=http://www8.janes.com/JDIC/JDET (accessed February 22, 2008).

———. "Wasp Class: Amphibious Assault Ships (LHDM)." Jane's Information Group. http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/jfs/jfs_3567.htm@current&pageSelected=allJanes&keyword=tank&backPath=http://search.janes.com/Search&Prod_Name=JFS&keyword= (accessed March 11, 2008).

———. "Northrop Grumman/IAI MQ-5 and RQ-5 Hunter." Jane's. http://www8.janes.com/JDIC/JDET/documentView.do?docId=/content1/janesdata/binder/juav/juav1298.htm@current&pageSelected=&keyword=Hunter_UAV&backPath=http://jdet.janes.com/JDIC/JDET&Prod_Name=JUAV&activeNav=http://www8.janes.com/JDIC/JDET (accessed May 5, 2008).

Johnson, Stuart E. and Arthur K. Cebrowski. *Alternative Fleet Architechture Design*. Fort Lesley J. McNair, Washington D.C.: National Defense University Center for Technology and National Security Policy, 2005, http://www.ndu.edu/ctnsp/Def_Tech/DTP%2019%20Alternative%20Fleet%20Architecture%20Design.pdf (accessed May 5, 2008).

Kastner, Kurt A. "USS San Antonio LPD-17 CO's Welcome Aboard." USS San Antonio (LPD 17). http://www.san-antonio.navy.mil/pco_letter.htm (accessed March 9, 2008).

Keegan, John. *The Iraq War*. 1st American ed. ed. Vol. 184Knopf, Alfred J, 2004.

Lambeth, Benjamin S. "Air Force-Navy Integration in Strike Warfare, A Role Model for Seamless Joint-Service Operations." *Naval War College Review* no. Winter (2008): 42-43.

———. *Combat Pair, the Evolution of Air Force-Navy Integration in Strike Warfare*. 1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138: RAND Corporation, 2007, http://www.rand.org (accessed February 15, 2008).

———. *Air Power Against Terror, America's Conduct of Operation Enduring Freedom*. Santa Monica, CA 90407-2138: RAND Corporation, 2005.

———. *American Carrier Air Power at the Dawn of a New Century*. Santa Monica, CA 90407-2138: RAND Corporation, 2005.

———. "Highlights of the Carrier Contribution." Chap. 3, In *American Carrier Air Power at the Dawn of a New Century*, 52-53-55. Santa Monica, CA: RAND Corporation, 2005.

Macdonald, Scot. "The Falklands Campaign: The British Reconquest and the Argentine Defense." *Marine Corps Gazette* 84, no. 3 (March 2000): 72, http://proquest.umi.com/pqdweb?did=51139028&Fmt=7&clientId=65345&RQT=309&VName=PQD.

McCaleb, Ian C. "Defense Officials: Air Operation to Last 'several Days'." CNN. http://archives.cnn.com/2001/US/10/07/ret.attack.pentagon/ (accessed May 7, 2008).

Myers, Richard B. "National Military Strategy of the United States of America." Chairman of the Joint Chiefs of Staff. http://www.defenselink.mil/news/Mar2005/d20050318nms.pdf (accessed September 6, 2007).

Naval Historical Center. "Admiral Elmo Russell Zumwalt, Jr., USN." Naval Historical Center. http://www.history.navy.mil/faqs/faq93-1.htm (accessed June 13, 2008).

———. "CVL-Small Aircraft Carriers." Department of the Navy-Naval Historical Center. http://www.history.navy.mil/photos/shusn-no/cvl-no.htm (accessed May 15, 2008).

Naylor, Sean. *Not a Good Day to Die: The Untold Story of Operation Anaconda*. 375 Hudson St., New York, NY 10014: The Berkley Publishing Group, 2005.

Newman, Daniel. "Vulture." Defense Advanced Research Projects Agency, Tactical Technology Office. http://www.darpa.mil/tto/Programs/Vulture.htm (accessed May 12, 2008).

O'Connell, John F. "Malvinas/Falklands War (Argentina-Great Britain) 1982." Chap. 4, In *The Effectiveness of Airpower in the 20th Century, Part Three (1945-2000)*. Vol. Part Three (1945-2000), 102-124. USA: iUniverse, 2006.

O'Rourke, Ronald. *Navy CVN-21 Aircraft Carrier Program: Background and Issues for Congress*. Washington D.C.: Congressional Research Service - The Library of Congress, 2007.

———. *Navy Ship Acquisition: Options for Lower-Cost Ship Designs - Issues for Congress*. Washington D.C. 20540-7500: Congressional Research Service - The Library of Congress, 2005.

Perin, Dave A. "Are Big Decks Still the Answer?" *Proceedings of the U.S. Naval Institute* 126, no. 6 (June 2001): 30-33.

Pike, John E. "F-35 Joint Strike Fighter (JSF) Lightning II." GlobalSecurity.org. http://www.globalsecurity.org/military/systems/aircraft/f-35.htm (accessed March 11, 2008).

Pirnie, Bruce R. and Edward O'Connell. "Counterinsurgency in Iraq." Chap. 3, In *Counterinsurgency in Iraq (2003-2006)*. Vol. 2, 35-36-44. Santa Monica, CA 90407-2838: RAND Corporation, 2008.

Posey, Carl. "Air War in the Falklands." *Air & Space Smithsonian* 17, no. 3 (Aug/Sep, 2002): 70, http://proquest.umi.com/pqdweb?did=141539931&Fmt=7&clientId=65345&RQT=309&VName=PQD.

Rumsfeld, Donald H. *Quadrennial Defense Review Report*. 1000 Defense Pentagon, Washington D.C. 20301-1000: Department of Defense, 2006, http://www.defenselink.mil/qdr/report/Report20060203.pdf (accessed 6 September 2007).

———. "National Defense Strategy of the United States of America." Office of the Secretary of Defense. http://www.au.af.mil/au/awc/awcgate/nds/nds.pdf (accessed September 6, 2007).

Senate Armed Services Committee. *Testimony on Iraq.* Wednesday, July 9 sess., July 9, 2003, http://www.defenselink.mil/speeches/speech.aspx?speechid=488 (accessed 15 May 2008).

Shanker, Thom and Eric Schmitt. "Threats and Responses: The Defense Secretary; Rumsfeld Seeks Consensus through Jousting." *The New York Times,* June 15, 2003, http://query.nytimes.com/gst/fullpage.html?res=9D0DEEDA1231F93AA25750C0A9659C8B63&sec=&spon=&pagewanted=1 (accessed May 15, 2008).

Smith, Gordon. "Battle Atlas of the Falklands War 1982 - by Land, Sea and Air." Naval-History.net. http://www.naval-history.net/NAVAL1982FALKLANDS.htm (accessed May 15, 2008).

Turner, Stansfield. "AIRCRAFT CARRIERS are on their Way OUT." *United States Naval Institute. Proceedings* 132, no. 7 (July 2006): 16, http://proquest.umi.com/pqdweb?did=1081643121&Fmt=7&clientId=65345&RQT=309&VName=PQD.

U.S. Air Force. "Factsheets: MQ-9 Reaper." Air Force Link. http://www.af.mil/factsheets/factsheet.asp?fsID=6405 (accessed May 12, 2008).

———. "MQ-1 Predator Factsheet." Air Force Link. http://www.af.mil/factsheets/factsheet.asp?fsID=122 (accessed May 10, 2008).

———. "Reaper UAV Now Flying in Afghanistan." Air Force Link. http://www.af.mil/news/story.asp?storyID=123071575 (accessed May 12, 2008).

U.S. Army. "Army Awards 'Warrior' Long Range UAV Contract." Army News Service. http://www4.army.mil/news/article.php?story=7722 (accessed May 12, 2008).

U.S. Navy. "History of USS Bataan." USS Bataan (LHD 5). http://www.bataan.navy.mil/site%20pages/History.aspx (accessed June 8, 2008).

U.S. Navy Fact File. "Aircraft Carriers - CVN 21 Program." Navy.mil. http://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=250&ct=4 (accessed May 5, 2008).

———. "Amphibious Assault Ships - LHA/LHD/LHA(R)." U.S. Navy. http://www.navy.mil/navydata/fact_display.asp?cid=4200&ct=4&tid=400 (accessed June 15, 2008).

———. "Amphibious Transport Dock - LPD." U.S. Navy.mil. http://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=600&ct=4 (accessed June 15, 2008).

———. "Bohomme Richard Departs 5th Fleet, Begins Transit Home." U.S. Navy.mil. http://www.navy.mil/search/display.asp?story_id=7858 (accessed March 11, 2008).

Weckerlein, Julie. "ROVER Gives Joint Force New Vision." Air Force Link. http://www.af.mil/news/story.asp?id=123013585 (accessed May 5, 2008).

White, Josh. "Defense Secretary Urges Military to Mold itself to Fight Iraq-Style Wars." *The Washington Post* Wednesday, (May 14, 2008): A04, http://www.washingtonpost.com/wp-dyn/content/article/2008/05/13/AR2008051301265.html (accessed 15 May 2008).

Williamson, Murray and Scales, Robert H., Jr. "The Air War." Chap. 5, In *The Iraq War: A Military History*, 154-155-183. United States of America: President and Fellows of Harvard College, Harvard University Press, 2003.

Winkler, David F. "A Long Look Back to the Present Day." *Sea Power* 45, no. 3 (March 2002): 55, http://proquest.umi.com/pqdweb?did=110643804&Fmt=7&clientId=65345&RQT=309&VName=PQD.

Zortman, James M., Massenburg, Walter B. and Kilkline, Thomas J., Jr. "Naval Aviation Vision 2020." Naval Aviation Enterprise. http://depts.washington.edu/uwnrotc/intro/Naval_Aviation_Vision_2020.pdf (accessed May 15, 2008).

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California

3. Andrew May
   Office of the Secretary of Defense
   Washington, District of Columbia

4. James Fitzsimonds
   Naval War College
   Newport, Rhode Island